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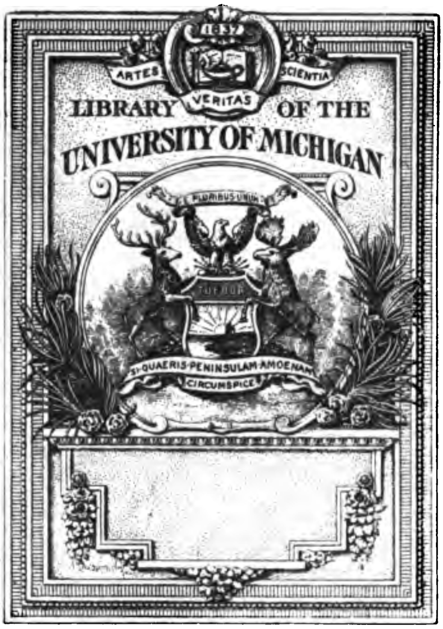
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DEPARTMENT OF COMMERCE AND LABOR
U.S. BUREAU OF CORPORATIONS
LUTHER CONANT, Jr., Commissioner

THE LUMBER INDUSTRY

PART I

STANDING TIMBER

JANUARY 20, 1913

WASHINGTON
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LETTERS OF TRANSMITTAL.

Department of Commerce and Labor,
Office of the Secretary,
Washington, January 20, 1913.

Sir: I have the honor to transmit herewith Part I of the Report of the Commissioner of Corporations on the Lumber Industry. This part deals with the quantity of merchantable standing timber in the United States, the concentration in the ownership of such timber, and some of the causes which have been chiefly responsible for such concentration of ownership.

Very respectfully,
Charles Nagel,
Secretary.

The President.

Department of Commerce and Labor,
Bureau of Corporations,
Washington, January 20, 1913.

Sir: I have the honor to transmit herewith the full text of Part I of a Report on the Lumber Industry, made to the President under your direction, and in accordance with the law creating the Bureau of Corporations. This part deals with the quantity of merchantable standing timber in the country, the concentration in the ownership of this timber, and some of the causes which have led to such concentration of ownership.

I desire to mention as especially contributing to the preparation of this part of the report Messrs. Wm. Boyd Hunter, Charles E. Edgerton, and Walter Y. Durand, of this Bureau.

Very respectfully,
Luther Conant, Jr.,
Commissioner.

To Hon. Charles Nagel,
Secretary of Commerce and Labor.

LETTER OF SUBMITTAL FOR FULL REPORT.

Department of Commerce and Labor,
Bureau of Corporations,
Washington, January 20, 1913.

Sir: I have the honor to submit herewith the full text of Part I of the Report of the Bureau of Corporations on the Lumber Industry.

The essential facts contained in this report were set forth in a letter of submittal and summary by the former Commissioner, Hon. Herbert Knox Smith, on February 13, 1911. The report shows a marked degree of concentration in the ownership of standing timber in the United States. The area covered by the Bureau's investigation contains about 80 per cent of the privately owned timber of the country. In this area 3 holders have 14 per cent of the privately owned timber, 90 have two-fifths, and 195 have nearly half. Marked concentration in the area outside the Bureau's detailed investigation also is indicated. Since the amount of standing timber is steadily diminishing and its value rapidly increasing, this concentration involves problems of far-reaching public importance.

In view of the facts already published, no extended comment appears necessary at this time. It seems proper, however, to emphasize that the present conditions of timber ownership are largely due, as clearly set forth in this report, to the land policy of the Federal Government, especially the great Federal land grants to railroads and the faulty operation of some of the general land laws. Instead of securing a wide distribution of the public domain in the hands of a vast number of independent owners, as apparently contemplated, the practical result of this legislation, at least so far as timberlands are concerned, has been a high degree of concentration of ownership. The report shows that the great land grants have directly resulted in enormous single holdings, while other great tracts of standing timber, transferred from the public domain in small parcels to private interests, and usually with no important return to the public treasury, have been gathered into large holdings by timber speculators. Concentration in the ownership of this timber, moreover, tends constantly to increase.

The national-forest policy inaugurated in the nineties, and now in successful operation, marked a fundamental change in the ideas which had formerly prevailed as to the handling of public timberlands. The basic principle of this policy is the retention of the fee title to the land and the sale from time to time of the timber only, with a view to the wisest use of the supply and to its proper conservation. By this policy the Government is able to secure for the public the full market value of this timber at the time of cutting, and at the same time to retain the land itself for reforestation or for such other use or disposition as may later seem advisable.

Attempts, however, are still made to secure the transfer of public timberlands to private owners under the same pleas of settlement which in the past often proved wholly specious and insincere. Much of the timberland still remaining in public ownership is adapted only for timber purposes. All that could be properly asked by a bona fide settler is the surface of arable land after the timber has been removed, but too frequently back of the argument made in the name of the "settler" is the desire to acquire the timber or other natural resources rather than the soil itself. It seems desirable, therefore, to direct public attention to the fundamental difference between disposing of agricultural lands to actual settlers whose industry contributes directly to the material and social upbuilding of the community, and the alienation of virgin timberlands, which do not require, and indeed hardly permit of, improvement by private owners, and the value of which is rapidly rising because of reduction in the supply and the increase in population. The public service involved in the mere speculative holding of this timber for an advance in price, under present conditions of settlement of the country, is practically negligible. When, moreover, such lands become concentrated in a comparatively few hands, there is, instead of a public service, a serious public danger.

Without entering into a discussion of possible solutions of certain grave problems involved in the present concentration of timber ownership, it may be pointed out that the Government to-day still owns, exclusive of the forests of Alaska, about one-fifth of the country's total supply of merchantable standing timber. It is the agency best adapted to practicing reforestation on a large scale. Recently, important suits for forfeiture of extensive timberlands have been brought by the Government on the ground of nonfulfillment of conditions imposed in the grants by which these lands were alienated from the public domain. For these reasons, it would appear, therefore, that the Government may later be able to materially strengthen its relative position as a timber owner.

The facts set forth in this report clearly point to the desirability of maintaining the integrity of the national forests and of extending to other publicly owned timber, including forests in Alaska and timberlands that may be recovered in forfeiture suits now pending or subsequently instituted by the Government, the cardinal principle of the national-forest policy, namely, the retention of the fee to such lands at least until the timber is removed. Decision will then have to be made between retaining such lands for reforestation and disposing of the surface for agricultural purposes. It seems clear, moreover, that the fundamental principle to be followed in the sale of the timber itself is that the terms of sale should be such as to insure to the public treasury substantially the full stumpage value at the time that such timber shall be actually cut.

Very respectfully,

LUTHER CONANT, Jr.,
Commissioner of Corporations.

The PRESIDENT.

LETTER OF SUBMITTAL OF FEBRUARY 13, 1911.

Department of Commerce and Labor,
Bureau of Corporations,
Washington, February 13, 1911.

Sir: I have the honor to submit herewith Part I of a Report on the Lumber Industry of the United States. This Part deals with the amount and ownership of standing timber. It does not treat of combinations in the manufacture or sale of lumber (as distinguished from ownership of standing timber), a discussion which is reserved for a further part.

The foremost facts shown are:

(1) The concentration of a dominating control of our standing timber in a comparatively few enormous holdings, steadily tending toward a central control of the lumber industry.

(2) Vast speculative purchase and holding of timberland far in advance of any use thereof.

(3) An enormous increase in the value of this diminishing natural resource, with great profits to its owners. This value, by the very nature of standing timber, the holder neither created nor substantially enhances.

These are the underlying facts, of tremendous significance to the public welfare. They are primarily the results of our public-land policy, long continued. The laws that represent that policy are still largely operative. The past history and present status of our standing timber drive home upon us the imperative necessity of revising our public policy for the future management of all our remaining natural resources. That history is here outlined.

From Government to private ownership.—Only 40 years ago at least three-fourths of the timber now standing was (it is estimated) publicly owned. Now about four-fifths of it is privately owned. The great bulk of it passed from Government to private hands through (*a*) enormous railroad, canal, and wagon-road grants by the Federal Government; (*b*) direct Government sales in unlimited quantities at $1.25 an acre; (*c*) certain public-land laws, great tracts being assembled in spite of the legal requirements for small holdings. Such laws were wholly inappropriate to forest regions; but, though vigorously condemned in several public reports, they are still largely in force. In theory, they were intended to distribute the public lands in small tracts as homes for freeholders. In fact, they actually furthered timber concentration in vast holdings. The 1,802 largest holdings of timber (as compared with a vastly wider distribution of public lands in nontimbered agricultural sections) involve 79,092,000 acres of timberland (including a considerable acreage of timber rights in the Southern Pine Region) and in addition some of these holders own 10,652,000 acres lying in timbered parts but not now bearing merchantable timber.

During this interval, and chiefly in the latter half thereof, the value of standing timber has increased tenfold, twentyfold, and even fiftyfold, according to local conditions. The present annual growth is only about one-third of the present annual cut. Replacement by new growth is very slow.

Examples of the increase during this interval are: From $5 to $30 an acre, $7 to $40, $20 to $150, $1 to $13, $4 to $140, $1 to $50. Specific tracts have been sold first for $24,000, and later for $153,000; $10,000, and later $124,000; $240,000, and later $2,500,000; $23,000, and later $500,000; $25,000, and later $1,125,000. These examples illustrate the remarkable profit made by certain individual holders.

What did the Government get for the timber? Of the southern pine sold for $1.25 an acre, much is now worth $60 an acre. Large amounts of Douglas fir in western Washington and Oregon, which the Government gave away, or sold at $2.50 an acre, now range from $100 to $200 per acre. The great redwood belt in California was alienated on similar terms, and some of it is now worth hundreds of dollars an acre. Practically none of the great forests in the public-land States was sold by the Government for more than $2.50 an acre. The great increase of value gives grave importance to the concentration of ownership.

The former Chief of Field Service of the General Land Office, H. H. Schwartz, stated officially (1909) that the timber and stone act—

> has resulted in the sale of over 12,000,000 acres of valuable timberlands, of which fully 10,000,000 acres were transferred to corporate or individual timberland investors by the entrymen. These lands brought to the people or General Government a gross sum of $30,000,000. At the date of sale they were reasonably worth $240,000,000. The profit of over $200,000,000 went not to the needy settler engaged in subduing the wilderness, but to the wealthy investors. Not over a fractional part of 1 per cent of the timber purchased from the United States under this act is held, consumed, or even cut by the men and women who made the entries.

An effective illustration of what has happened under our land laws appears in the report of the United States Forester for 1910:

> An investigation emphasizes the probability that heavily timbered lands, if opened to entry, would pass into the hands of large owners of timber. Of 705,000 acres eliminated from the Olympic National Forest in 1900 and 1901 on the ground that the land was chiefly valuable for agriculture and that the settlement of the country was being retarded, 523,720 acres passed ultimately into the hands of owners who are holding it purely as a timber speculation. Three companies and two individuals own over 178,000 acres, in holdings of from 15,000 to over 80,000 acres each. Of timbered homestead claims on this eliminated area, held by 100 settlers, the total area under actual cultivation is only 570 acres, an average of but 5.7 acres to each claim. It will be seen that the original purpose of the elimination was defeated, and that bona fide settlement was not materially advanced.

CONTROL OF THE TIMBER CONTROLS THE WHOLE INDUSTRY.—Whatever power over prices may arise from combinations in manufacture and distribution (as distinguished from timber owning), such power is insignificant and transitory compared to the control of the standing timber itself or a dominating part thereof. The Senate and House resolutions, to which this investigation is responsive, ask for the causes of the high prices of lumber and the effect of combination upon such prices. The resolutions, therefore, required determination of both the amount and the control of standing timber.

AMOUNT OF STANDING TIMBER.—There is now left in continental United States about 2,200 billion board feet of privately owned standing timber, of which 1,747 billion is in the " investigation area," covered in great detail by the Bureau. This area includes the Pacific-Northwest, the Southern Pine Region, and the Lake States, and contains 80 per cent of all the private timber in the country. In addition, there are about 539 billion feet in the national forests and about 90 billion feet on other nonprivate lands. Thus, the total amount of standing timber in continental United States is about 2,800 billion board feet. The present annual drain upon the supply of saw timber is about 50 billion feet. At this rate the timber now standing, without allowance for growth or decay, would last only about 55 years.

The present commercial value of the privately owned standing timber in the country, not including the value of the land, is estimated (though such an estimate must be very rough) as at least $6,000,000,000. Ultimately the consuming public will have to pay such prices for lumber as will give this timber a far greater value.

This is the first comprehensive and methodical investigation of the amount and ownership of our standing timber. It rests on the best information obtainable from records of timber owners or the knowledge of men in the industry, information which daily forms the basis of actual business dealings. (A physical canvass of the forests was out of the question.) The data collected by field work in about 900 counties, assembled, mapped, checked, and weighed in the office, are reliable within a relatively small margin of error. All figures relate to merchantable saw timber, in terms of lumber yield. The unit " board foot " is a foot square and an inch thick.

CONCENTRATION OF TIMBER OWNERSHIP.—Three vast holdings alone, the greatest in the country, those of the Southern Pacific Company, the Weyerhaeuser Timber Company, and the Northern Pacific Railway Company (including their subsidiary companies) together have 238 billion feet, or nearly 11 per cent of all our privately owned timber. They have 14 per cent of that in the " investigation area." With the five next largest they have over 15 per cent of the total privately owned timber and over 19 per cent of that within the investigation area. Finally, nearly one-half (48 per cent) of the private timber in that area is held by only 195 great holders. The term " holder " covers any single interest—individual, corporate, or group—which is so united as to be under one control.

The Pacific-Northwest.—Five-elevenths of the country's privately owned standing timber is in the Pacific-Northwest (California, Oregon, Washington, Idaho, and Montana), 1,013 billion feet. One-half of this is now owned by 37 holders; many of these are closely connected. The three largest holders (named above) alone have nearly one-quarter. This section now furnishes only one-sixth of the annual cut. Thus its timber is being largely held for the future, and the large owners there will then be the dominating influence in the industry.

The Southern Pacific Company holding is the greatest in the United States—106 billion feet. This is about 6 per cent of the private timber in the investigation area, and 10 per cent of that in the Pacific-Northwest. It is difficult to give an adequate idea of its immensity. It stretches practically 680 miles along that railroad between Portland and Sacramento. The fastest train over this distance takes 31 hours. During all that time the traveler thereon is passing through lands a large proportion of which for 30 miles on each side belongs to the railroad, and in almost the entire strip this corporation is the dominating owner of both timber and land.

The second largest holder is the Weyerhaeuser Timber Company (including its subsidiary companies), with 96 billion feet. This does not include further very extensive timber interests of the Weyerhaeuser family and close associates.

These two holdings would supply the 46,584 sawmills in the country for four and a half years. They have one-eleventh of our total private timber.

The third largest, the Northern Pacific Railway Company, has 36 billion feet.

These three holdings have enough standing timber to build an ordinary five or six room frame house for each of the 16,000,000 families in the United States in 1900. If sawed into lumber and placed in cars, their timber would load a train about 100,000 miles long.

The holdings of the two railroad companies are Government grants, and 80 per cent of the Weyerhaeuser Timber Company holding was bought from the Northern Pacific grant. Many other large holdings (here and in other regions) were mainly purchased from some land grant.

Southern Pine Region.—In the Southern Pine Region there are 634 billion feet of privately owned timber. Concentration in total timber is much less than in the Pacific-Northwest. There is, however, a high concentration in the more valuable species, longleaf yellow pine and cypress. Sixty-seven holders own 39 per cent of the longleaf yellow pine, 29 per cent of the cypress, 19 per cent of the shortleaf and loblolly pine, and 11 per cent of the hardwoods.

The Lake States.—In Minnesota, Wisconsin, and Michigan there are 100 billion feet of privately owned timber. In Wisconsin 96 holders have three-fourths of all the timber. In Michigan 110 holders have 66 per cent. In Minnesota 6 holders have 54 per cent of the very valuable white and Norway pine, 16 per cent of the other conifers, and 2 per cent of the hardwoods. Taking all three States, 215 holders have 65 per cent of all the timber.

EFFECT OF CONCENTRATION.—Such concentration in standing timber, if permitted to continue and increase, makes probable a final central control of the whole lumber industry. A few strong interests, ultimately holding the bulk of the timber, can set the price of timber and its products. The manager of the National Lumber Manufacturers' Association recently said to lumbermen on the Pacific coast:

> The day of cheap lumber is passing and soon will be gone, but the men who make the money will be those who own timber and can hold it until the supply in other parts of the country is gone. Then they can ask and get their own price.

Certain further factors, not exactly measurable, increase still more the real concentration. First, a further interweaving of interests, corporate and personal, connects a great many holdings which the Bureau has treated as separate; second, there are very large totals of timber so scattered in small tracts through larger holdings that they are substantially "blocked in" or "controlled" by the larger holders; third, the concentration is much higher in the more valuable species.

General information obtained indicates a very high concentration in timber ownership outside the investigation area.

POLICY OF GREAT HOLDERS.—The largest holders are cutting little of their timber. They thus reserve to themselves those incalculable profits which are still to accrue with the growth of the country, the diminishing of timber supply, and the further concentration and control thereof. Many of the very men who are protesting against conservation and the national forest system because of the "tying up" of natural resources are themselves deliberately tying them up far more effectively for private gain.

The fact that mature timber is thus withheld from use is clear evidence that great additional profits are expected to accrue through further increase in value.

LAND MONOPOLY.—Standing timber is not the only question. When the timber has been cut the land remains. There has been created, therefore, not only the framework of an enormous timber monopoly, but also an equally sinister land concentration in extensive sections. This involves also a great wealth in minerals. The Southern Pacific has 4,318,000 acres in northern California and western Oregon, and, with the Union Pacific, which controls it, millions of acres elsewhere. (The Government, however, is now suing to annul title to the Southern Pacific lands in Oregon for noncompliance with the terms of the original grants.) The Northern Pacific owns 3,017,000 acres of timber land and millions more of nontimbered land. The Weyerhaeuser Timber Company owns 1,945,000 acres. In Florida, three holders have 4,200,000 acres, and the 182 largest timber holders have over 16,990,000 acres, nearly one-half the land area of the State. In the whole investigation area the 1,802 largest holdings of timber involve 79,092,000 acres of timberland (including a considerable acreage of timber rights in the Southern Pine Region), and in addition some of these holders own 10,652,000 acres lying in timbered parts, but not now bearing merchantable timber (not including Northern Pacific and Southern Pacific lands in nontimbered regions).

Finally, to timber concentration and to land concentration is added, in our most important timber section, a closely connected railroad domination. The formidable possibilities of this combination in the Pacific-Northwest and elsewhere are of the gravest public importance.

THE FUTURE.—These are the facts of the lumber business in its most important feature, the natural supply. The paramount consideration remains still to be stated. There are many great combinations in other industries whose formation is complete. In the lumber industry, on the other hand, the Bureau finds now in the making a combination caused, fundamentally, by a long-standing public policy. The concentration already existing is sufficiently impressive. Still more impressive are the possibilities for the future. In the last 40 years concentration has so proceeded that 195 holders, many interrelated, now have practically one-half of the privately owned timber in the investigation area (which contains 80 per cent of the whole). This formidable process of concentration, in timber and in land, certainly involves grave future possibilities of impregnable monopolistic conditions, whose far-reaching consequences to society it is now difficult to anticipate fully or to overestimate.

Such are the past history, present status, and apparent future of our timber resources. The underlying cause is our public-land policy, resulting in enormous loss of wealth to the public and its monopolization by a few interests. It lies before us now as a forcible object lesson for the future management of all the natural resources still remaining in the hands of the Government.

Very respectfully,

HERBERT KNOX SMITH,
Commissioner of Corporations.

The PRESIDENT.

REPORT OF THE COMMISSIONER OF CORPORATIONS ON THE LUMBER INDUSTRY.

Part I.—STANDING TIMBER.

SUMMARY.[1]

FUNDAMENTAL IMPORTANCE OF CONTROL OF STANDING TIMBER.

This Part of the report on the lumber industry treats of the amount of merchantable saw timber now standing in the country, the concentration in the ownership of it, the rapid increase in its value, and the operation of the Government's land policy. Subsequent Parts will deal with concentration in ownership in particular areas, the cost of manufacturing lumber from standing timber, the price of lumber, and the competitive conditions in the marketing of lumber.[2]

Certain basic facts in the lumber industry are as follows:

First. The remaining supply of standing timber in continental United States (excluding Alaska) is now about 2,800 billion board feet, of which about 2,200 billion is privately owned. (The unit "board foot" is a foot square and an inch thick.)

Second. There has come about, and there is still proceeding, a very remarkable concentration in the ownership of this remaining standing timber in the hands of a comparatively few interests. This concentration results chiefly from the speculative holding of timber lands for future profit, primarily made possible by our long-standing public-land policy

Third. From the time when the vast majority of our present timber supply left the hands of the one great original owner, the United States, till the present there has been an enormous increase in the value of standing timber. This increase has varied greatly according to local conditions, but practically everywhere it has been manyfold—sixfold, tenfold, twentyfold, thirtyfold, and in some cases fiftyfold. The present commercial value of the privately owned standing timber in the country, not including the value of the land, is estimated (though in the nature of the case such an estimate must be very rough) as at least $6,000,000,000.

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[1] Since this summary first appeared, under date of Feb. 13, 1911, it has been revised in a few particulars. Thus, the map showing timber concentration in a portion of Louisiana, which was inserted in the summary for purposes of illustration, has been withdrawn to be used in a later part of the report. Some revision has also been made of the figures on stumpage values and on concentration in ownership of land.

[2] For a more detailed statement as to matters to be taken up in subsequent parts, see p. 32.

These conditions must be considered in the light of the further facts that standing timber is a natural resource created almost exclusively by nature; that, where it has not been destroyed, it is substantially in the same condition as when it left the hands of the Government; that human effort, or the private owners that hold and have held it, have added practically nothing to it; that while a certain amount of reforestation is possible, standing timber is a resource similar, in a large measure, to our ore and coal deposits; that the present annual consumption of timber is about three times the annual growth, and the demand is steadily increasing; that speculative holding of timber land for future rise in no way improves the character of the timber and does not give such public service as is given by those who acquire lands for actual present use and improvement. While the profits of speculative timber holding have been enormous, as will be hereafter shown, the risks of such holding and the services rendered by the holders are peculiarly small in comparison with those profits.

These great facts have brought about certain results of tremendous significance from the standpoint of the public welfare. The timber supply is a diminishing natural resource. Its increasing concentration into a comparatively few strong hands has conferred upon those strong holders a vast power over the lumber industry and over prices therein, and has itself greatly accelerated the enormous rise in timber values.

This investigation has been conducted in response to certain resolutions of the Senate and House, as follows:

SENATE RESOLUTION.

> *Resolved*, That the Secretary of Commerce and Labor be, and he is hereby, authorized and instructed immediately to inquire, investigate, and report to Congress, or to the President when Congress is not in session, from time to time as the investigation proceeds, as to the lumber trade or business of the United States which is the subject of interstate or foreign commerce and make full inquiry into the cause or causes of the high prices of lumber in its various stages of manufacture from the log; and the said investigation and inquiry shall be conducted with the particular object of ascertaining whether or not there exists among any corporations, companies, or persons engaged in the manufacture or sale of lumber any combination, conspiracy, trust, agreement, or contract intended to operate in restraint of lawful trade or commerce in lumber or to increase the market price of lumber in any part of the United States.
>
> That the Secretary of Commerce and Labor be required to make the said investigation at his earliest possible convenience, and to furnish the information above required from time to time and as soon as it can be done consistent with the performance of his public duties.

HOUSE RESOLUTION.

> *Resolved,* That the Secretary of Commerce and Labor be, and is hereby, requested to investigate the causes of the high prices of lumber in the various stages of manufacture and sale, and the said investigation shall be conducted with the particular object of ascertaining whether or not these high prices have resulted in whole or in part from any contract, agreement, or combination in the form of trust or otherwise, or conspiracy in restraint of commerce among the several States and Territories or with foreign countries; also whether the said prices have been manipulated in whole or in part by any corporation, joint stock company, or corporate combination engaged in commerce among the several States or with foreign nations, and if so, to investigate the organization, capitalization, profits,,conduct and management of the business of such corporations, companies, or corporate combinations, and make early report of his findings according to law.

Both resolutions call, in substance, for information on the causes of the high prices of lumber, and whether or not these high prices have resulted from any contract, agreement, or combination in restraint of commerce.

At the start of the investigation it was clear, in view of the facts above stated, that the vital public problem was the ownership and control of the raw material, the standing timber, or, as it is called in the trade, the "stumpage." No answer to the request of the resolutions as to the course of prices, or the existence of combination and its effect on the lumber business and the public, could safely be made without first determining approximately (1) the amount of the remaining supply of standing timber, and (2) the degree of concentration in the ownership thereof. These facts are basic.

The rapidly increasing concentration of control of the lumber industry is not due to any particular economy of large manufacturing plants. Conditions are such that the output of the most efficient plant is small compared with the total output. The largest sawmill in the country cuts less than one-half of 1 per cent of the total annual output of lumber. Four-fifths of the output comes from mills each cutting less than 25 million board feet, or about one-twentieth of 1 per cent of the annual cut. A recent report of the Bureau of the Census gives the lumber cut of the United States for 1909 as 44,509 million board feet, sawed by 46,584 sawmills.

The conditions of the lumber industry do not favor such enlargement of individual plants as is advantageous in the refining of petroleum, for example, or the making of steel. The bulk and weight of timber are great in comparison with its value. The relative cost of transporting logs for considerable distances is great, except in the few localities where it is possible to float them. Moreover, a large part of the log is waste. There is a great saving in cutting up the log close to its point of origin and shipping out only the valuable parts.

It is therefore impracticable to establish a few great central sawmill plants, and bring timber long distances to these from the forests. A sawmill of small size and small investment can manufacture economically and compete in the industry. To work most economically, a mill, in many localities, should have a logging railroad; but a mill of very moderate size will justify such a road, and the economical maximum will still be rather closely limited by transportation costs. A sawmill can not be moved without loss of most of its investment. Its term of activity must be long enough to allow it to pay for its cost. The larger the mill, the farther it is apt, within a given period, to have to bring its logs; and the growing cost of transportation will soon counterbalance any saving in manufacturing cost which might be attained by great size.

In view of these considerations, and especially the great number of sawmills and the absence of any one or any few plants of dominating size, it is apparent that the economic conditions in the manufacture of lumber (as distinguished from the ownership of standing timber) are not exceptionally conducive to concentration.

A somewhat similar condition exists with respect to the distribution of lumber, whether wholesale or retail, although here the opportunities for combination are more nearly comparable with those in most other industries.

Certainly, therefore, any combination in the lumber industry proper, whether in manufacturing or distribution, must be of far less fundamental import than an effective control of standing timber. If the ownership of this raw material itself could be controlled by a few interests, these would naturally dominate all branches of the industry. They could refuse to sell this raw material to outsiders, and thus actually monopolize and conduct the lumber business, or they could put such a price on the standing timber as virtually to control the price of the manufactured product. The price of lumber, of course, is determined, not by the cost of cutting the trees and converting them into lumber, but by the supply offered and the demand of consumers. An excessive price would naturally be exacted if comparatively few interests were able to control the timber supply.

Indeed, it is almost axiomatic that a real control of the raw material of any great industry is the most effective means of combination or monopoly.

STANDING TIMBER A DIMINISHING NATURAL RESOURCE.

The foregoing facts assume added significance because the annual consumption of timber is very much greater than the growth of the country's forests, which constitute, as stated, a natural resource of much the same character as coal, iron ore, or any other raw material found in a state of nature. It is true that man can not add a single ton to the earth's natural deposits of minerals, whereas the supply of standing timber can be increased by planting; but practically no effort of that kind has so far been made. Even the possibilities of such increase by planting are limited, and the time required for it is very great. Up to the present, all the standing timber of the country, except a negligible fraction, has grown in a state of nature. In these virgin forests growth is balanced by decay, and it will be many years before an increase resulting from either natural or artificial reforestation will offset the annual consumption. The present annual growth is estimated by the Forest Service at only about one-third the annual cut.

Because of this fact that standing timber is a natural resource constantly diminishing in amount its value would naturally tend to increase, even if there were no pronounced concentration of ownership.

The certainty of such increase is clearly recognized by timber owners. Thus the manager of the National Lumber Manufacturers' Association, which embraces the most important mills of the country, said, in August, 1910, in addressing a meeting of lumbermen on the Pacific coast:

> The day of cheap lumber is passing, and soon will be gone, but the men who make the money will be those who own timber and can hold it until the supply in other parts of the country is gone. Then they can ask and get their own price.

If, in addition, the ownership of this natural resource be further concentrated in a comparatively few hands, the opportunity for the control and raising of prices will be immensely increased. The inducement, therefore, to bring about such concentration of ownership is very strong. As shown in this report, a marked degree of concentration has already taken place and conditions are now ripe for further concentration on a very large scale.

The investigation of the Bureau of Corporations has therefore been largely concerned with the ownership of standing timber. It was necessary to arrive at an approximate idea of the amount of standing timber in the country, since no reliable information whatever on this point had ever been gathered. The lumbermen themselves have urged the Government to determine the supply of timber, in order that private owners might manage their properties in the light of that information. In May, 1907, the National Lumber Manufacturers' Association passed a resolution stating that "in view of our rapidly decreasing forest resources it is of the greatest importance that an accurate determination be made of the kind and quantity of standing timber in the United States, in order to secure a sound basis for plans for forest management and utilization."

This Part of the Bureau's report comprises two distinct features:

1. A determination of the amount of standing timber in the United States.

2. A study of the concentration of ownership of that timber.

AMOUNT OF STANDING TIMBER IN THE UNITED STATES.

There is a total of about 2,800 billion board feet of standing timber in the country. Of this about 2,200 billion feet is privately owned, about 539 billion feet is in the national forests, and about 90 billion feet is on the unreserved public lands, national parks, State lands, and Indian reservations. This total is on mill output basis. (See p. 60.)

The Bureau's investigation has been concerned only with privately owned timber suitable for sawing. Of the total of about 2,200 billion feet so owned, 1,747 billion feet, or 80 per cent, was covered by an elaborate investigation by the Bureau within a so-called "investigation area," which embraced the principal timber regions of the country. This "investigation area" is as follows: (1) California, Oregon, Washington, Idaho, and Montana; (2) the parts of Virginia, North Carolina, South Carolina, and Georgia east and south of the hardwood forests of the Appalachian Mountains; Florida, Alabama, Mississippi, Louisiana, Texas, Arkansas, and the southeast corner of Missouri; (3) Michigan, Wisconsin, and Minnesota. For ease of reference these three divisions are called the Pacific-Northwest, the Southern Pine Region, and the Lake States, respectively. For those States not entirely within the investigation area, the counties included are shown in the full report. All privately owned merchantable saw timber in the investigation area was included in the inquiry, so that the data in this report are complete for the timber in that territory. No canvas has ever been made of the privately owned timber in the United States outside of this area, but it has been roughly estimated by the Forest Service at 450 billion feet. The Forest Service has also estimated the amount of standing timber owned by the Federal Government and by the various States, and that on Indian reservations, at 629 billion feet.

The results of the Bureau's investigation of the amount of standing timber in continental United States (excluding Alaska) may therefore be summarized as follows:

	Billion feet.
Grand total	2,826
Privately owned timber	2,197
In "investigation area"	1,747
Pacific-Northwest	1,013
Southern Pine Region	634
Lake States	100
Outside of "investigation area" [1]	450
Total owned by Federal Government in national forests [1]	539
Total otherwise owned by Federal Government, owned by States, and on Indian reservations [1]	90

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[1] Estimates furnished by Forest Service. In this connection see p. 66.

This total of about 2,800 billion feet, it should be repeated, is the total for merchantable saw timber only; that is, timber of such size and quality as to be suitable for the use of a sawmill under present conditions in the industry. It does not include timber suitable only for posts, small poles, and similar purposes, or firewood.

The great loss involved in turning the tree trunk into the products of the mill makes the "board-foot" measurement very different from the cubic contents of the tree. The Bureau's estimates of standing timber are for the amount of lumber that would be sawed from the timber if cut according to present methods.

The above figures on the standing timber of the country represent the first comprehensive and methodical investigation that has ever been made. While estimates of the timber supply have been put out from time to time during the past twenty years, these were little more than guesses. The figures now given by the Bureau are considerably above any previous "estimates." Forest Service Circular 97, issued April 24, 1907, presents the principal estimates made up to that time. Only two of them have sufficient basis to make comparison worth while. One is presented in the circular as based on the returns of the Twelfth Census (1900), and the other is attributed to Fernow, as of 1902. Not allowing for timber cut during the intervening years, the figure now established by the Bureau of Corporations is more than twice the former, and 40 per cent above the latter.

The Forest Service estimates the yearly drain on the saw timber of the country at about 50 billion board feet. Without allowing either for new growth or for any increase in the rate of consumption, therefore, the Bureau's total for all timber in the United States (2,800 billion feet) would represent about 55 years' supply, and that for privately owned timber alone (2,200 billion feet) only 44 years' supply. The actual duration, of course, can not be estimated, on account of the unknown changes in rate of consumption and the possibilities of reforestation.

BUREAU'S METHOD OF DETERMINING TIMBER SUPPLY.

The results established by the Bureau for the investigation area—constituting 1,747 billion feet, or 80 per cent of the grand total of 2,200 billion feet privately owned — were compiled chiefly from facts furnished by the timber owners themselves. A physical canvass of the forests of the country would have been wholly impracticable; it would have required enormous expense and a great length of time. Nearly all important timber owners, however, have had fairly good estimates of their timber made at some time or other. Such estimates are made by experts known as "cruisers." Sometimes the cruisers have made only a general survey, by going about through a large forest tract. In other cases they have gone carefully over the ground, back and forth in parallel paths, noting a separate estimate for each 40 acres, for each 10 acres, or even for each 2½ acres. Sometimes the trees on small typical tracts, say an acre each, have been counted, and the results applied to much larger areas. In this and other ways timber owners generally have come to have a very definite opinion as to the amount of timber in their holdings. Such estimates vary considerably even for the same tract, while estimates for different tracts of a generally similar character may differ very widely. But, by long experience, men learn to form judgments which on an average come fairly near the mark. There is, however, a general tendency of cruisers to underestimate, since their employers, who buy on their estimates, naturally desire conservative figures.

The work of the Bureau is based, therefore, on estimates made chiefly by or for the owners. The Bureau, however, did not merely get a single estimate from each owner and then compile these; it endeavored to get as many estimates as possible on each tract. Thus, an estimate on the holding of a given lumber company might be obtained from the company's headquarters, say, in Minneapolis; another estimate from a local agent, say, in Oregon; and still another, perhaps, from a cruiser at another point. Moreover, men in the timber business are often familiar with holdings in which they are not directly interested, and also with the average stands of timber over a large area, such as a township or even a county. Again, in some States of the Pacific-Northwest, notably in Washington, estimates have been made by public officials for purposes of taxation.

Agents of the Bureau were first sent to the principal lumber centers to secure the location of and estimates for some of the largest timber holdings. Then agents were sent into every one of about 900 timbered counties in the investigation area to get all available information from every responsible source. They were instructed to obtain a separate report for each holder who had as much as 60 million feet of timber, and such general estimates as were possible for the aggregate of smaller holdings; in some cases individual reports on holdings of less than 60 million feet were obtained. The limited time and money available made it necessary to adopt a minimum below which the holdings should not be separately ascertained. The limit of 60 million feet was fixed merely from the point of view of the extent to which the investigation could be carried. It is not a division between small investors and large investors. Holdings of 60 million feet in valuable timber, ranging in price from $10 per thousand down, are naturally the property of wealthy individuals or corporations of considerable size. Eighteen hundred and two holdings, each having 60 million board feet or more, were found in the investigation area. The amount of timber in these holdings is shown by 10 size groups for each State (p. 23). The total of all timber privately owned in holdings of less than 60 million board feet is shown for each State in a single group, "group 11."

These estimates when secured were very carefully studied, and checked in every possible way. Where serious doubt existed of their correctness, further field investigation was made.

In this work the Bureau secured the exact location of nearly all holdings of more than 60 million feet in the entire investigation area, with the exception of Virginia, the Carolinas, Georgia, and Texas, where the absence of the rectangular Government survey made the matter of securing locations extremely difficult. By having the exact location of holdings the danger of duplication of lands was practically eliminated, since the different holdings were all brought together graphically on plats. Again, the area accounted for in these separately reported holdings gave a good check on estimates of miscellaneous holdings in the unplatted area.

INCREASE MADE BY BUREAU IN ESTIMATES.

Practically all the estimates obtained were on the basis of "log scale"; that is, while they referred nominally to the quantity of lumber obtainable from the given tracts, they were based actually on certain "log rules," by which logs of given dimensions are reduced to a supposed equivalent in sawed lumber. The measurement of the logs by these conventional rules almost invariably falls below the quantity of lumber finally obtained. Moreover, as already shown, the natural tendency of cruisers and others is to underestimate their timber, even on a log-scale basis. It was necessary, therefore, to increase the estimates gathered by the Bureau to allow for the admitted "overrun at the mill," and for the general underestimation. This allowance, while necessarily somewhat arbitrary, was made only after a careful study of the best available information. The percentages of increase used by the Bureau were as follows: California, 10 per cent, except redwood, for which 30 per cent was used; Oregon, 10 per cent; Washington, 20 per cent (except for 6 of the largest holdings, for which only 15 per cent increase was made, and a seventh for which the increase was only 10 per cent); and Idaho, Montana, the Lake States, and the entire Southern Pine Region, 25 per cent.

While increasing considerably the total amount of timber over that indicated by the original estimates themselves, these percentage increases do not affect the degree of concentration of ownership in any region, as they were applied alike to all groups, including group 11.

It should be remembered that the Bureau's figures take account only of such timber as is suited for manufacture into lumber.

The Bureau's figures on the amount of standing timber, therefore, rest on a collection and verification of the best information now existing on standing timber; namely, the estimates which form the basis of actual dealings in timber property in the ordinary course of business. The figures published by the Bureau for the investigation area are reliable within a relatively small margin of error.

GENERAL DISTRIBUTION OF STANDING TIMBER IN THE UNITED STATES.

From the table already given (p. 6) it is apparent that the two great sources of timber supply, so far as privately owned timber is concerned, are the Pacific-Northwest, with 1,013 billion feet, and the Southern Pine Region, with 634 billion feet. Moreover, 82 per cent of the standing timber owned by the United States Government is in the Pacific-Northwest, and nearly all the remainder is in other States of the Rocky Mountain region. Most of that owned by the States and nearly all that on Indian reservations is also in the Pacific-Northwest. Out of the grand total of about 2,800 billion feet for the whole country, no less than 1,512.9 billion feet, or about 55 per cent, is in the five States comprising that timber region. The total, by States and by form of ownership, is as follows:

TOTAL STANDING TIMBER IN THE PACIFIC-NORTHWEST.

[In billions of board feet. Thus, 1,512.9=1,512,900,000,000 board feet.]

State.	Total.	Privately owned.	Not privately owned.	
			National forests.	All other.[1]
Pacific-Northwest	1,512.9	1,013.0	440.8	59.1
California	381.4	248.1	114.4	18.9
Oregon	545.8	398.1	135.8	11.9
Washington	391.0	294.6	81.6	14.8
Idaho	129.1	50.4	71.0	7.7
Montana	65.6	21.8	38.0	5.8

[1] Includes national parks, military reservations, unreserved public lands, Indian reservations, and timberland owned by the States.

The predominating species of timber in the Pacific-Northwest is Douglas fir, which alone constitutes 52 per cent of the total privately owned. Western pine constitutes 15 per cent and redwood 10 per cent, the three species together aggregating 77 per cent. No other single species contributes as much as 6 per cent. By far the heaviest stands occur on the Pacific slope west of the Cascades. Thus, of the 1,013 billion feet of privately owned timber in the entire Pacific-Northwest, 867 billion feet (85 per cent) is west of the Cascades in Oregon and Washington, and in California, leaving only 146 billion feet for the eastern portion of this region.

In the Southern Pine Region the total of 634 billion feet of privately owned timber is distributed as follows:

	Billion feet.		Billion feet.
Louisiana	119.8	Georgia (part)	46.0
Mississippi	95.3	North Carolina (part)	42.9
Arkansas	78.7	South Carolina (part)	30.7
Florida	73.9	Virginia (part)	14.5
Texas	66.0	Missouri (part)	9.9
Alabama	56.3		

Of this total it will be seen that 293.8 billion feet, or nearly one-half, is in three States—Louisiana, Mississippi, and Arkansas. Florida, Texas, and Alabama, the next three States in order, together have 196.2 billion feet, or over 30 per cent of the total. As noted in the table, the figures for the other States are for portions of these States only. (See p. 6.)

The predominating species in this Southern Pine Region is yellow pine, which contributes 384.4 billion feet (232.3 billion feet longleaf and 152.1 billion feet shortleaf and loblolly) to the total of 634 billion feet; cypress, 40.4 billion feet; and all hardwoods together, 209.2 billion feet. The hardwoods include the least valuable timber in this region.

In the Lake States the total of 100 billion feet of privately owned timber is distributed as follows:

	Billion feet.
Michigan	47.6
Wisconsin	29.2
Minnesota	23.2

The Lake Region is the least important of the three in quantity of timber, but much of its timber is exceedingly valuable.

CONCENTRATION OF THE OWNERSHIP OF STANDING TIMBER.

SUMMARY OF PRINCIPAL HOLDINGS.

The Bureau's investigation has disclosed a remarkable concentration of the ownership of the country's standing timber. A general indication of this great concentration is afforded by the following tables, in which the timber holdings of the country are arranged by groups of holders according to size of holding in the investigation area; the figures in all cases are for privately owned timber.

Group 1 contains the timber holdings of the Southern Pacific Company, the Weyerhaeuser Timber Company, and the Northern Pacific Railway Company. The other groups contain the holdings ranging between the limits shown below:

Group 2: From 13,000,000,000 feet to 25,000,000,000 feet.
Group 3: From 5,000,000,000 feet to 13,000,000,000 feet.
Group 4: From 3,500,000,000 feet to 5,000,000,000 feet.

Group 5: From 2,000,000,000 feet to 3,500,000,000 feet.
Group 6: From 1,000,000,000 feet to 2,000,000,000 feet.
Group 7: From 500,000,000 feet to 1,000,000,000 feet.
Group 8: From 250,000,000 feet to 500,000,000 feet.
Group 9: From 125,000,000 feet to 250,000,000 feet.
Group 10: From 60,000,000 feet to 125,000,000 feet.
Group 11: Less than 60,000,000 feet.

For the entire investigation area the extent of concentration, by these groups, is as follows:

CONCENTRATION OF TIMBER OWNERSHIP BY GROUPS IN ENTIRE INVESTIGATION AREA.

Group.	Number of holders.	Amount of timber owned, in billions of feet.	Per cent of total.
Total		1,747.0	100.0
Groups 1-10	1,802	1,208.8	69.2
Group 1	3	237.5	13.6
Group 2	5	102.0	5.8
Group 3	14	119.5	6.8
Group 4	26	115.3	6.6
Group 5	42	116.2	6.7
Groups 1-10—Continued.			
Group 6	105	149.2	8.5
Group 7	190	132.4	7.6
Group 8	273	96.4	5.5
Group 9	489	84.8	4.9
Group 10	655	55.5	3.2
Group 11		538.2	30.8

In the following table the facts are set forth in cumulative form, so that the amount of timber, and the proportion of the whole, controlled by a given number of groups in order, is at once apparent.

CONCENTRATION OF TIMBER OWNERSHIP BY GROUPS, SHOWN CUMULATIVELY, IN ENTIRE INVESTIGATION AREA.

	Number of holders.	Amount of timber owned, in billions of feet.	Per cent of total.
Total		1,747.0	100.0
Group 1	3	237.5	13.6
Groups 1 and 2	8	339.5	19.4
Groups 1-3	22	459.0	26.2
Groups 1-4	48	574.3	32.8
Groups 1-5	90	690.5	39.5
Groups 1-6	195	839.7	48.0
Groups 1-7	385	972.1	55.6
Groups 1-8	658	1,068.5	61.1
Groups 1-9	1,147	1,153.3	66.0
Groups 1-10	1,802	1,208.8	69.2
Group 11		538.2	30.8

From these tables it will be seen that 3 holdings include no less than 237.5 billion feet, or nearly 11 per cent of the privately owned timber in the entire country, and over 13.5 per cent of the privately owned timber in the investigation area. These 3 holders are the Southern Pacific Company, the Weyerhaeuser Timber Company, and the Northern Pacific Railway Company. Five other holders ranking next in importance own in the investigation area an aggregate of 102 billion feet, or 4.6 per cent of the total privately owned timber of the country and 5.8 per cent of that in the investigation area. Thus the 8 largest holders together own approximately 340 billion feet of timber, or 15.4 per cent of the total privately owned timber of the country and 19.4 per cent of that in the investigation area.

Twenty-two holders own 26.2 per cent of all the timber in the investigation area; 195 holders own 48 per cent. Stated in another way, more than one-eighth of the total timber in the investigation area (this representing 80 per cent of the total privately owned timber of the United States) is owned by only 3 holders; more than one-fourth is owned by only 22 holders. Almost one-half in this area is owned by 195 holders.

The most marked concentration is in the hands of the comparatively few large holders of the upper groups; the lower groups control a much less important percentage. Thus, while the 385 holders in groups 1 to 7, inclusive, control 55.6 per cent of the timber in the investigation area, the 273 holders in group 8 control only 5.5 per cent, the 489 holders in group 9 only 4.9 per cent, and the 655 holders in group 10 only 3.2 per cent.

Furthermore, these 10 groups, 1,802 holdings, embrace nearly 70 per cent of the total timber in the investigation area, while group 11, the remaining holdings, aggregating unnumbered thousands, have in all only 538.2 billion feet, or 30.8 per cent of the total.

This pronounced concentration is discussed in detail later. At the moment it is essential to point out a few general considerations as to the significance of these figures.

DEFINITION OF THE TERM "HOLDER."

The concentration of ownership shown in this report is a minimum only. Through the interweaving of interests, the interrelations of the individuals and corporations holding title to the timberland, there is a concentration of control far beyond what is shown by the listing of nominal or legal owners. The owners embraced in very many important groups of this kind avoided furnishing the specific information necessary to determine the real control.

The effect of these interrelations does, to some degree, appear in the Bureau's figures. Some corporations gave the names of their stockholders and the amount of stock owned by each, and also the amount of stock owned by the corporations themselves in other timber-owning companies; some individuals stated, apparently in good faith, their stock holdings in corporations connected with the lumber industry; and from independent sources some specific facts and much general information were gathered. This evidence was carefully considered, and where it was sufficient to show a common control of nominally separate holdings these holdings were combined and considered as one. Such combinations were not made because of mere common management or harmonious operation. The test was that of actual control, through the ownership of more than half the stock by the interest in question. If an individual owning timber had more than half the stock of a timber-owning corporation, the two holdings were combined as one. A corporation was combined with others in which it held a majority of the stock. It frequently happened that one or a few individuals appeared in several corporations, holding half or more of the stock in each, and these corporate holdings were combined as one.

Thus, wherever the Bureau secured information showing that the same interest owned half or more of the stock of two or more owners of record, these holdings were combined and counted as one. But undoubtedly a large number of such cases exist which were not revealed by the very limited information obtained. Furthermore, there is a vast amount of interrelation short of actual control through the ownership of half or more of the stock, but still of high practical effectiveness; and the interrelation of this sort, even so much of it as is shown by the information at hand, could not be presented in the tables. In many cases corporations are practically under the same control, although the common holding may be less than half of the stock of some of them; and even where strict control does not result, the interrelations through minor holdings of stock serve to establish a very important general condition of harmonious operation. There are also in such interrelations significant possibilities for future additional concentration.

The following are examples of the possibilities and limitations of such combining of interests: The Southern Pacific holding, as stated in this report, is made up of the timber of the Oregon and California Railroad Company and of the Central Pacific Railway Company—subsidiaries of the Southern Pacific Company. Similarly, the holding of the Weyerhaeuser Timber Company includes not only the timber of that concern, but that of its direct subsidiaries, the Clarke County Timber Company, the Weyerhaeuser Lumber Company, the Weyerhaeuser Land Company, the Pokegama Sugar Pine Lumber Company, the Pelton-Reid Sugar Pine Lumber Company, and the Weyerhaeuser Realty Company. On the other hand, the Weyerhaeuser Timber Company holding does not embrace the interests of the Weyerhaeuser family or their associates in other extensive timber holdings not known to be so controlled that they will be managed as a unit with the holdings of the Weyerhaeuser Timber Company itself. The holdings of the Northern Pacific Railway Company are chiefly held direct, a relatively small amount being owned by a subsidiary concern, the Northwestern Improvement Company.

Another important factor still further enhances the actual concentration of timber control to a degree much greater than the figures of ownership alone suggest. This is the fact that a very large amount of timber in the aggregate is so scattered in small holdings that it is readily controlled by larger timber owners immediately adjoining. For instance, the holder of a small tract of timber which is completely surrounded by the lands of a large holder must as a rule sell to him, and practically on his terms. A timber company which owns land giving the only practical outlet for other timber lying back of it may be said to "control" that timber. If a small holding is a long distance from a railroad or a stream, it is substantially impossible for the owner to go to the expense of getting a right of way or of constructing a logging railroad. Therefore it frequently happens that the only disposition that such a "blocked-in" small holder can make of his standing timber is to sell to one of the larger holders near him. This does not necessarily mean that the small holder is entirely at the mercy of the larger one, since these small holdings are almost inevitably affected, at least in some degree, by any general rise in timber values. Information gathered by the Bureau, however, very clearly shows that as a rule the market values of relatively small holdings are proportionately much less than the values of large and compact tracts in the same vicinity. The small holder, therefore, is a less important factor in the timber and lumber business from a commercial standpoint than even the small size of his holding would indicate. This fact is very generally recognized by timber interests. It is a common thing for large timber holders to speak of the amount of timber of others which they "control," in addition to what they own, because it is blocked in or bottled up in the manner described. This is an important consideration which should be kept in mind in judging of the marked degree of concentration here set forth.

TIMBER HOLDINGS OF THE SOUTHERN PACIFIC COMPANY, THE WEYERHAEUSER TIMBER COMPANY, AND THE NORTHERN PACIFIC RAILWAY COMPANY.

Keeping in mind the foregoing explanatory statements, it is now proper to proceed with the details of timber concentration.

The three largest holdings of standing timber in the United States are those of the Southern Pacific Company, the Weyerhaeuser Timber Company, and the Northern Pacific Railway Company (including their subsidiary companies). As already stated, they aggregate the enormous total of 237.5 billion feet, or practically 11 per cent of the total privately owned timber in the United States and over 13.5 per cent of the privately owned timber within the Bureau's investigation area. In the Pacific-Northwest, where the whole of these holdings lie, they represent almost one-fourth of the total privately owned.

Southern Pacific Company holding.—The holding of the Southern Pacific Company (including subsidiaries) amounts to 105.6 billion feet. This is the largest single holding in the United States. It exceeds the total of all private timber in Michigan, Wisconsin, and Minnesota. It represents nearly one-twentieth of the total privately owned timber of the country, practically 6 per cent of the total in the investigation area, and over 10 per cent of all the privately owned timber in the Pacific-Northwest. About 71 billion feet of the Southern Pacific's timber is in Oregon and about 35 billion feet in California.

It is difficult to give an adequate idea of the immensity of this holding. It stretches practically all the way from Portland, Oreg., to Sacramento, Cal., a distance of 682 miles. The running time of the fastest train between these two points is thirty-one hours; yet during all that time the traveler is passing through lands a large proportion of which for 30 miles on each side of him belongs to the corporation over whose tracks he is riding, and in almost the entire strip, 60 miles wide and 682 miles long, this corporation is the dominating owner of both timber and land. This holding consists of the unsold part of Government land grants in Oregon and northern California held by the Oregon and California Railroad Company and the Central Pacific Railway Company, subsidiaries of the Southern Pacific Company.

A very significant fact in connection with this enormous holding is that the Southern Pacific Company is not selling its timber, but is holding this valuable supply, evidently in the confident hope of a further great advance of price.

Weyerhaeuser Timber Company holding.—The holding of the Weyerhaeuser Timber Company (including its directly owned subsidiary concerns) is the second largest in the United States, amounting to 95.7 billion feet. This is only about 10 billion feet less than that of the Southern Pacific. Most of this timber—nearly 77 billion feet—is in Washington; about 18.7 billion feet is in Oregon, and an insignificant fraction in California. It is chiefly Douglas fir.

It should be repeated that this holding, enormous as it is, includes only the timber directly owned by the Weyerhaeuser Timber Company and its subsidiary corporations. It does not include further very extensive timber interests of members of the Weyerhaeuser family and their close associates. This great holding, also, is nearly all being held off the market for the future rise in timber values.

The timber in these two largest holdings, those of the Southern Pacific Company and the Weyerhaeuser Timber Company, therefore, reaches the enormous total of 201 billion feet, or one-fifth of the total timber in the Pacific-Northwest, and almost exactly one-eleventh of the privately owned timber in the United States. At the present rate of cutting the timber in these two holdings would supply the 46,584 sawmills in the United States for 4½ years, and would supply all the sawmills in Washington, Oregon, and California for no less than 29 years.

Northern Pacific holding.—The timber holding of the Northern Pacific Railway Company, which ranks third in importance, amounts to 36.2 billion feet. This, it will be seen, is much less than either the Southern Pacific or the Weyerhaeuser holding. Most of it is owned by the Northern Pacific Railway Company directly, but a small part is owned by a subsidiary concern, the Northwestern Improvement Company.

Summary.—These three holdings together contain 238 billion feet, or nearly one-fourth of all the privately owned timber in the five States of the Pacific-Northwest, the most important remaining source of timber supply for the United States; they contain three-eighths as much as all the timber in the Southern Pine Region.

An impression of the vast amount of timber represented by these combined holdings may perhaps be given by the statement that if it were sawed into lumber it would load a train about 100,000 miles long. Or, again, these three holdings have enough standing timber to build an ordinary 5 or 6 room frame house for each of the 16,000,000 families in the United States in 1900.

These three principal holdings based upon Government land grants.—Before proceeding to discuss the question of concentration of timber ownership further, it is worth pointing out that these three immense holdings were virtually made possible by the land grants of the Federal Government to great railroad corporations.

Under these grants enormous tracts of land were acquired by some of the leading transcontinental railroads. Thus, there had been patented to the subsidiaries of the Southern Pacific Company, in Oregon and California, up to June 30, 1910, no less than 12,180,000 acres of land—not all timbered, of course—while the Central Pacific Railroad Company, one subsidiary, had secured in the States of Idaho, Nevada, and Utah 4,878,000 acres more. The Union Pacific, which now controls the Southern Pacific,[1] has also secured patent to no less than 19,136,000 acres of land in various States, while there have been patented to the Northern Pacific the enormous total of 32,664,000 acres. This is a total acreage patented to the Northern Pacific and to the several railroads now in the Union Pacific-Southern Pacific system of 68,858,000 acres, or over 107,000 square miles, an area nearly as large as the land area of the six New England States and New York. Furthermore, lands are still being patented in large amounts, especially to the Northern Pacific.

It is not to be inferred that these railroads still own the acreage noted above as patented to them. In various financial reports and unofficial manuals, however, it is stated that the present land holdings of these railroads are as follows: Union Pacific, 975,128 acres; Southern Pacific, 13,879,932 acres; Northern Pacific, 9,949,985 acres.

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[1] On Dec. 2, 1912, the Supreme Court of the United States declared the Union Pacific-Southern Pacific merger illegal.

These published reports do not state whether the acreage given includes all lands transferred by the railroad corporations to any subsidiary land corporations of their own, nor whether it includes any lands owned that were not acquired under land grants. (See p. 233.)

A very large amount of the land granted to these railroads is not timberland, and much of it lies outside the investigation area. Thus little of the 19,136,000 acres secured by the Union Pacific had any timber, and little of the 4,878,000 acres patented to the Central Pacific in Idaho, Nevada, and Utah. Furthermore, of the 12,180,000 acres patented to the Southern Pacific and its subsidiaries in California and Oregon, much lies in nontimbered regions; the same is true of the immense grant to the Northern Pacific. Since, as stated above, much of the land of these railroad corporations lies outside the special area of investigation, the Bureau is not prepared to make any statement of the total timbered area still held by them. Within the investigation area of the Bureau, however, the timbered acreage of the Southern Pacific reaches the very large total of 3,842,000 acres, not including about 130,000 acres in Texas and Louisiana, in which the Southern Pacific has an interest. The unsold timbered acreage of the Northern Pacific within the investigation area, including a considerable proportion of lands claimed by it but to which patent has not yet been secured, is 3,017,000 acres.

Practically all of the acreage of the Southern Pacific Company was secured through Government land grants. The enormous holding of the Weyerhaeuser Timber Company, aggregating 1,945,000 acres, is based on the Northern Pacific land grant, no less than four-fifths of it having been bought from the Northern Pacific. In 1900 a single block of 900,000 acres was thus acquired at $6 an acre. Further purchases from the Northern Pacific brought up the total thus acquired to about 1,525,000 acres. In the main purchase the Weyerhaeuser Timber Company selected the best of the Northern Pacific's timberland in western Washington.

In addition to the very extensive acreage thus sold to the Weyerhaeuser Timber Company, the Northern Pacific has also sold a vast amount of timberland to a subsidiary of the Amalgamated Copper Company and smaller yet important tracts to other large companies, in many of which the Weyerhaeuser family and their associates are interested. Notwithstanding the fact that the timberland which it now retains is thus but a remnant of its original holding, the company nevertheless ranks third in the list of the country's timber owners.

The character of the Northern Pacific's timber, and, in consequence, that of the Weyerhaeuser Timber Company, was considerably improved through the "forest lieu" legislation. This was a provision included in an appropriation act of June 4, 1897, which allowed a settler or owner (thus including land-grant railroads) whose lands fell within the boundaries of a forest reserve to exchange such lands for an equal area to be selected from unoccupied and nonmineral lands anywhere in the public domain; these selections were subsequently restricted to surveyed lands. Under this legislation (since repealed) the Northern Pacific made very extensive relinquishments of poor land within the national forests, securing an equal acreage, selected especially for timber value, elsewhere in the public domain.

A special lieu-selection law affecting the Northern Pacific was passed in connection with the creation of Mount Rainier National Park by act of March 2, 1899. This provided for the relinquishment of the Northern Pacific lands within the national park area and within the Pacific Forest Reserve, giving the railroad the privilege of selection of surveyed or unsurveyed nonmineral lands in any State into which it extended. Under this act the railroad relinquished about 450,000 acres, obtaining in exchange heavily timbered lands in other portions of the Northwest, of which at least 300,000 acres was sold to the Weyerhaeuser Timber Company and to other companies in which the Weyerhaeuser family is interested.

This forest-lieu legislation was intended to enable the Government to regain as much land as possible for reservation in compact blocks, and to enable settlers within the forest-reserve limits, who so desired, to relocate where the settlement of the country would not be arrested by such wholesale withdrawals. By the actual working of this legislation, however, a large amount of comparatively worthless land was returned to the Government by the Northern Pacific Railway Company, which obtained in exchange an equal amount of excellent timbered land. Thus, while the land-grant legislation largely made possible such immense single holdings as those of the Southern Pacific, Weyerhaeuser, and Northern Pacific Companies, this forest-lieu legislation resulted in improving the character of the Northern Pacific lands (including those sold to the Weyerhaeuser Timber Company and other companies in which the Weyerhaeuser family is interested), and consequently increased their value, through the privilege of making selections in heavily timbered regions on the relinquishment of much less valuable land, or even comparatively worthless land, within forest-reserve limits.

CONCENTRATION IN PACIFIC-NORTHWEST.

All the timber of the three largest holders just discussed is in the Pacific-Northwest, where these three holders own no less than 23.5 per cent of the 1,013 billion feet of privately owned timber. Aside from these three great holdings, there is a further very marked concentration of ownership in this region. This is illustrated by the following table. The group limits in this table are the same as in the preceding tables.

In this table and in those to follow on the Southern Pine Region and the Lake States, each holding is grouped according to its total size in the investigation area. Some holdings are thus counted in each of two or three divisions. This method does not always bring together the holdings which include the most timber in a particular geographic division, and does not show, for any division by itself, the full concentration of ownership which has been reached there.

CONCENTRATION OF TIMBER OWNERSHIP BY GROUPS, SHOWN CUMULATIVELY, IN PACIFIC-NORTHWEST.

	Number of holders.	Amount of timber owned, in billions of feet.	Per cent of total.		Number of holders.	Amount of timber owned, in billions of feet.	Per cent of total.
Total	....	1,013.0	100.0	Groups 1-6	131	663.8	65.6
				Groups 1-7	217	723.0	71.4
Group 1	3	237.5	23.5	Groups 1-8	313	757.3	74.8
Groups 1, 2	8	338.9	33.5	Groups 1-9	489	789.1	77.9
Groups 1-3	20	436.3	43.1	Groups 1-10	711	807.4	79.7
Groups 1-4	38	507.3	50.1	Group 11	....	205.6	20.3
Groups 1-5	64	571.9	56.5				

The pronounced concentration of timber ownership in the Pacific-Northwest is at once apparent from this table. The 3 largest companies own over 23 per cent of the total, or almost one-fourth, while 5 more own 10 per cent, these 8 holders having a little more than a third of the total for this region. The next 12 holders own over 9 per cent, giving the 20 principal holders 43 per cent of the total. The next 18 own 7 per cent; thus no less than 50 per cent of the total privately owned timber in this vast region is in the hands of 38 holders. The next 6 groups, comprising 673 holders, together own less than 30 per cent of the total.

Moreover, under the method of grouping explained in the paragraph preceding this table, two holdings which lie chiefly in the South, but partly in the West, are counted in group 4 in both regions. This tends to understate the actual concentration of ownership in the Pacific-Northwest. If one western holding from group 5 were substituted for these two, one-half of the total privately owned timber in the Northwest would appear in the hands of 37 owners instead of 38.

A few of these 37 holders own additional timber in the Southern Pine Region and in the Lake States.

CONCENTRATION IN SOUTHERN PINE REGION.

The extent of concentration of timber ownership in the Southern Pine Region is similarly brought out in the following table, using the cumulative form. The group limits are the same as before.

CONCENTRATION OF TIMBER OWNERSHIP BY GROUPS, SHOWN CUMULATIVELY, IN SOUTHERN PINE REGION.

	Number of holders.	Amount of timber owned, in billions of feet.	Per cent of total.
Total		634.0	100.0
Group 1			
Group 2			
Group 3	3	22.1	3.5
Groups 3, 4	11	54.8	8.7
Groups 3-5	29	102.7	16.2
Groups 3-6	67	152.9	24.1
Groups 3-7	159	211.6	33.4
Groups 3-8	307	262.9	41.5
Groups 3-9	558	304.9	48.1
Groups 3-10	925	336.3	53.0
Group 11		297.7	47.0

There are no such enormous single holdings of timber in the Southern Pine Region as in the Pacific-Northwest. Group 1 and group 2, consisting of holders of 13 billion feet or more, are not represented here. Nevertheless, taking this region by itself, concentration of ownership has made great progress. Thus, the first 29 holders—these being included in groups 3 to 5, inclusive—own 16 per cent, or nearly one-sixth of the total standing timber in this region; the first 67 holders own 24 per cent; the first 159 holders own a third; while 558 holders own nearly one-half of the total in this region.

The full significance of the concentration in the Southern Pine Region, however, does not appear in these percentages, for it depends largely on the different values of different species. The most valuable timber in this region is yellow pine and cypress, and the least valuable is hardwoods. In fact, a large proportion of the hardwoods of the Southern Pine Region has until recently been regarded as only an incumbrance upon the land. It is significant that the greatest degree of concentration is shown in longleaf yellow pine and cypress, while hardwood shows the lowest. Sixty-seven holders, each having more than a billion feet, own 39 per cent of the valuable longleaf yellow pine, 19 per cent of the shortleaf and loblolly pine, 29 per cent of the cypress; and 11 per cent of the hardwoods. Considering holders each having more than 60 million feet, 925 own 73 per cent of the longleaf yellow pine, 46 per cent of the shortleaf and loblolly, 72 per cent of the cypress, and 32.5 per cent of the hardwoods. Thus while concentration in this southern region is less pronounced than in the Pacific-Northwest, it is most marked in the most valuable species, and lowest in the hardwoods, the least valuable species.

CONCENTRATION IN THE LAKE STATES.

The Lake States show a somewhat higher degree of concentration than the Southern Pine Region. This can readily be seen from the following table. Group limits are the same.

CONCENTRATION OF TIMBER OWNERSHIP BY GROUPS, SHOWN CUMULATIVELY, IN LAKE STATES.

	Number of holders.	Amount of timber owned, in billions of feet.	Per cent of total.		Number of holders.	Amount of timber owned, in billions of feet.	Per cent of total.
Total		100.0	100.0	Groups 2-6	17	23.0	23.0
Group 1				Groups 2-7	44	37.5	37.5
Group 2		.6	.6	Groups 2-8	78	48.3	48.3
Groups 2, 3		.6	.6	Groups 2-9	147	59.3	59.3
Groups 2-4	4	12.2	12.2	Groups 2-10	215	65.1	65.1
Groups 2-5	10	15.9	15.9	Group 11		34.9	34.9

To avoid misunderstanding it is well to note that the total amount of timber shown above is 100 billion feet, and consequently the figures of absolute amount and of percentage are the same.

Concentration in the Lake States, as in the southern pine belt, is most marked in the most valuable species. Thus, in Minnesota 6 holders have no less than 54 per cent of the very valuable white and Norway pine, together with 16 per cent of the other conifers, but only 2 per cent of the hardwoods. Thirty-two holders (each having 60 million feet or more) own 77 per cent of the white and Norway pine, 27 per cent of the other conifers, and only 11 per cent of the low-value hardwoods. In other words, over three-fourths of the white and Norway pine and over one-fourth of the other conifers in the State of Minnesota are owned by only 32 holders. In Wisconsin 10 holders have 24 per cent of all the timber, and 96 holders (each having 60 million feet or more) have three-fourths of it. In Michigan 12 holders have 28 per cent of all the timber, and 110 holders (each having 60 million feet or more) have two-thirds.

Taking the three Lake States together, 4 holders have 12 per cent of the timber, 17 holders have 23 per cent, 44 holders have 37 per cent, and 215 holders (each having 60 million feet or more) have 65 per cent.

RELATIVE CONCENTRATION IN THE THREE PRINCIPAL REGIONS.

The following table brings together the figures previously shown for the investigation area, and also shows the distribution of the timber in each group by States. The entries in italics opposite "Investigation area" show the number of holders in each group, and the entries in italics opposite each of the three geographic divisions show the number of the holders in that group who own in that division. These figures for a geographic division do not show the number of holdings of that size in that division, but rather the number of holdings of that size in the investigation area, all or a part of which is in that division. Because of this distribution of some holdings between two or more divisions, the totals of the entries in italics for the three divisions are greater than the corresponding entries for the investigation area. In a few cases, chiefly in the Southern Pine Region and in the Lake States, where the portion of a holding in that division is less than about 15 per cent of the minimum limit of the group, the holding has been excluded from the count for that division. (See p. 106.) This was done in order to keep these insignificant parts of certain holdings from obscuring the important holdings in the group in that region.

HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA, GROUPED BY SIZE.

[In billions of board feet. Thus, 237.5=237,500,000,000 board feet. Each holding is grouped according to its total in the investigation area. See p. 11 for description of the groups, and footnote to Table 20.]

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
		3	*5*	*14*	*26*	*42*	*105*	*190*	*273*	*489*	*655*	*1,802*	
Investigation area.....	1,747.0	237.5	102.0	119.5	115.3	116.2	149.2	132.4	96.4	84.8	55.5	1,208.8	538.2
		3	*5*	*12*	*18*	*26*	*67*	*86*	*96*	*176*	*222*	*711*	
Pacific-Northwest...........	1,013.0	237.5	101.4	97.4	71.0	64.6	91.9	59.2	34.3	31.8	18.3	807.4	205.6
California...............	248.1	35.2	49.0	24.9	27.5	21.2	26.4	12.4	5.2	4.2	3.3	209.3	38.8
Oregon...................	398.1	89.2	34.6	33.3	26.7	24.4	39.9	23.3	13.7	12.7	7.6	305.4	92.7
Washington.............	294.6	102.1	14.8	11.8	14.1	16.8	22.9	21.8	12.3	13.8	6.8	237.2	57.4
Idaho....................	50.4	4.5	3.0	19.1	1.0	2.0	2.7	1.6	2.3	1.1	.3	37.6	12.8
Montana................	21.8	6.5	.....	8.3	1.7	.2	.....	.1	.8	.....	.3	17.9	3.9
				3	*8*	*18*	*38*	*92*	*148*	*251*	*367*	*925*	
Southern Pine Region.......	634.0	.....	.....	22.1	32.7	47.9	50.2	58.7	51.3	42.0	31.4	336.3	297.7
Missouri (part)..........	9.9	.....	.....	.....	.....	.3	1.2	1.7	.4	.9	.7	5.2	4.7
Arkansas...............	78.7	.....	.....	.....	2.9	3.5	6.1	8.3	7.8	5.2	4.1	37.9	40.8
Texas....................	66.0	.....	.....	11.2	3.6	6.0	.6	4.9	4.2	3.3	2.7	36.5	29.5
Louisiana...............	119.8	.....	.....	3.7	15.2	14.8	15.8	11.4	9.4	7.5	5.0	82.8	37.0
Mississippi..............	95.3	.....	.....	6.5	4.3	7.9	7.7	4.6	7.2	5.5	4.1	47.8	47.5
Alabama................	56.3	.....	.....	.....	1.0	.9	2.6	7.4	3.6	3.8	2.4	21.7	34.6
Florida..................	73.9	.....	.....	.6	.7	7.4	11.9	13.6	10.0	8.4	5.6	58.2	15.7
Georgia (part)..........	46.0	.....	.....	.....	.....	2.2	1.1	.2	3.2	1.9	2.3	10.9	35.1
South Carolina (part)...	30.7	.....	.....	.1	.....	3.3	.4	3.1	2.0	2.2	2.1	13.2	17.5
North Carolina (part)...	42.9	.....	.....	.....	4.9	.3	2.4	2.9	3.2	3.0	1.7	18.4	24.5
Virginia (part)..........	14.5	.....	.....	.....	.1	1.3	.4	.6	.3	.3	.7	3.7	10.8
					4	*6*	*7*	*27*	*34*	*69*	*68*	*215*	
Lake States.................	100.0	.....	.6	.....	11.6	3.7	7.1	14.5	10.8	11.0	5.8	65.1	34.9
Michigan................	47.6	.....	.2	.....	6.0	1.6	3.4	6.4	5.0	5.8	2.8	31.2	16.4
Wisconsin...............	29.2	.....	.....	.....	.6	2.1	2.0	5.9	4.8	4.4	2.2	22.0	7.2
Minnesota...............	23.2	.....	.4	.....	5.0	.....	1.7	2.2	1.0	.8	.8	11.9	11.3

The Pacific-Northwest contains the country's great reserve supply of timber, and it is here that the concentration of ownership is most marked. Fifty per cent of all the timber in this great region is in the hands of the first 4 groups, which comprise only 38 holders. The first 4 groups of the Lake district hold but 12.2 per cent, and practically all of this is held by 4 holders in group 4, the holdings in the Lake States of owners large enough in the investigation area to be placed in the first 3 groups being insignificant. While, therefore, concentration in the Lake States is very marked, it is much less pronounced than in the Pacific Northwest. In the Southern Pine Region the first 4 groups of holders own but 8.7 per cent of the total; and the first 2 groups, comprising the largest holders, do not appear there.

One reason why concentration is less marked in the Southern Pine Region than in the Pacific-Northwest is that no railroad grant in the South compares in size with the grants in the Pacific-Northwest. Such grants are very largely responsible for the tremendous concentration in the Pacific-Northwest. A further reason is that the density of stands is very much less in the South than in the West. A stand of 8,000 to 10,000 feet per acre is considered large in most of the Southern Pine Region, though 15,000 and 20,000 feet to the acre, and even more, may be found within comparatively small areas in Louisiana, eastern Texas, and lower Mississippi. But stands of 100,000 feet or more to the acre are common on the Pacific slope, and in exceptional cases, as in the redwood belt of California, selected acres have been reported with 1,000,000 feet each. Moreover, the lumbering operations of many years have brought most parts of the South to a condition unfavorable to assembling immense holdings. Large buyers, whether they plan to establish a mill or to sell their timber standing, prefer solid blocks of virgin forest. The parts of the South where considerable areas of such forest still exist are comparatively restricted.

These differences of stand, whether due to nature or to lumbering operations, have affected the desirability of the timber for speculative purposes, and so have affected the proportions of the timber of different regions which wealthy speculators have bought up. A more important point, however, has been the price at which the timber could be bought. It is true that vast tracts of land in the South were sold at low prices by the Government many years ago; but when investors began to assemble very large holdings, the timber in the Pacific-Northwest could be bought at a lower price, compared with its probable future price, than that in the South. This was the chief additional influence, after the enormous land grants to the Pacific railroads, which contributed to the phenomenal concentration of ownership in the western part of the country.

VALUE OF STANDING TIMBER.

The existing widespread speculative holding of timberlands has been referred to. The fact has been pointed out that such holders add little or no improvement to such timber; that their risks incurred and public services rendered therein are practically negligible in comparison with the great profits received from the rise in timber prices.

It is desirable, therefore, to indicate concretely and in some detail this rise in price that has taken place during the period of concentration, and thus to give some suggestion of the profits which have thereby accrued to the private holders of timber.

The value of timber varies so extremely, according to location, species, quality, and stand, that it is impossible to measure accurately the average amount of the advance. For the purpose of this report it is not necessary so to measure it. The comparative figures hereafter given are not intended to represent the average values of any kind of timber or to establish in any sense a timber price. The danger of using any of the following figures to establish an average price can be best illustrated by a single example. In Washington a lumber company paid about $3.25 per thousand in 1906 for a certain piece of timber. But this same company refused in the spring of 1909 to pay more than 22 cents a thousand for another piece in the same township of similar timber but less favorably situated for logging. This shows the danger of using these figures for any other purpose than that for which they are here given. That purpose is simply to demonstrate a movement of price, rather than the average price of any class of timber; and for that purpose they are conclusive.

That the increase has been nothing less than enormous is recognized by the men most familiar with the business. In speaking of the rise of prices in the last twenty years they refer to changes from 12½ cents to $4 per thousand; from 10 cents to $3 a thousand; from $5 to $20 an acre; 300 per cent in ten years; from $1.50 to $20 an acre; from 50 cents to $3 per thousand. These figures are for southern pine. In cypress: From 15 cents to $5 a thousand. In the Lake States men in the business similarly speak of increases from "no market value" (hemlock and hardwoods) to $4 to $10 a thousand; from $2 to $6 a thousand (hardwoods). In the Pacific-Northwest similar general statements are made of rises in value, such as 15 cents to $2.50 a thousand; 10 cents to $2.50 a thousand; "no market value" to $2.50 a thousand; 75 cents to $2.50 a thousand.

While these statements give no accurate measure of the general rise of stumpage values, they do show that, according to the reports of lumbermen, such rise during the last twenty or thirty years has been enormous.

These general statements can be best substantiated by citing a number of particular tracts of timber which have been sold twice during this period and comparing the two prices.

PRICES OF IDENTICAL TRACTS OF TIMBER AT DIFFERENT DATES.

State.	Earlier sale.		Later sale.	
	Date.	Amount.	Date.	Amount.
SOUTHERN STATES.				
By tracts:				
Virginia	1895	[1] $3,500.00	([2])	$48,000.00
Georgia	1902	24,000.00	1906	153,000.00
Mississippi	1897	10,000.00	1907	[3] 124,000.00
Per acre:				
Mississippi	1900	[1] 5.00	1907	30.00
Louisiana	1899	[1] 7.00	1904	40.00
Do	1882	1.25	1909	59.50
Arkansas	1900	1.00	1904	13.50
LAKE STATES.				
Per acre:				
Wisconsin	1894	1.25-3.00	1908	30.00
Do	1891	5.00	1904	22.00
PACIFIC-NORTHWEST.				
By tracts:				
Washington	1901	127,500.00	1906	500,000.00
Do	1891	800.00	1909	18,500.00
Do	1899	10,000.00	1909	110,000.00
Do	1900	6,000.00	1907	96,000.00
Do	1900	11,840.00	1907	115,000.00
Idaho	1901	240,000.00	1909	2,500,000.00
Oregon	1892	24,000.00	1907	460,000.00
Do	1892	23,000.00	1908	[1] 500,000.00
Per acre:				
Washington	1882	20.00	1909	150.00
Oregon	1896	[4] 5.00	1908	108.75
Do	1900	8.00	1903	24.00
Do	[5] 1901-3	6.00-10.00	1907	20.00
California	1900	18.00	1909	[1] 100.00

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[1] In these cases the sale was not consummated; but the owner offered to sell at the earlier date, or a buyer to purchase at the later date, at the price named.

[2] "Afterwards."

[3] Contract to sell.

[4] About.

[5] Purchases made in various parcels.

Certain records of prices paid or received for timberlands during considerable periods of years have also been obtained by the Bureau. The table following shows purchases of "timber rights" which were made by one company in the North Carolina pine region from 1895 to 1909.

ESTIMATED COST OF STUMPAGE IN PURCHASES OF TIMBER RIGHTS BY A SOUTHERN COMPANY, 1895-1909.

Year.	Quantity (estimated).	Cost.	Cost per M feet (estimated).	Year.	Quantity (estimated).	Cost.	Cost per M feet (estimated).
	M feet.				*M feet.*		
1895	16,080	$9,704	$0.60	1903	26,301	$29,857	$1.14
1896	4,235	1,740	.41	1904	64,136	95,771	1.49
1897	87,455	35,135	.40	1905	53,839	111,933	2.08
1898	80,103	56,019	.70	1906	29,922	55,110	1.84
1899	107,910	82,740	.77	1907	4,982	12,150	2.44
1900	28,645	25,047	.87	1908	3,375	9,975	2.96
1901	9,316	8,701	.93	1909	2,985	7,828	2.62
1902	39,593	45,148	1.14				

In 1895–1897 this company made large purchases at an average cost of about 40 cents a thousand. During the next 4 years the average price was about twice as great; during the 3 years following, 3 times as great; during the next 5 years, 5 times as great. Moreover, the real increase was greater than this, because the timber obtained by the earlier purchases was much more than was shown in the estimates; the estimates of the earlier years were exceptionally "conservative."

The State of Minnesota has for many years kept a record of the amount of timber sold from State lands, the total price received, and the average price per thousand feet. These average prices from 1880 to 1909 have been as follows:

Year.	Average price per M feet.	Year.	Average price per M feet.	Year.	Average price per M feet.
1880	$1.47	1890	$2.25	1900	$5.17
1881	1.62	1891	2.14	1901	5.93
1882	1.57	1892	1.89	1902	8.38
1883	1.77	1893	1.83	1903	6.02
1884	2.11	1894	1.80	1904	7.71
1885	1.73	1895	2.18	1905	7.18
1886	2.19	1896	2.06	1906	9.00
1887	2.35	1897	2.52	1907	7.83
1888	2.54	1898	2.86	1908[1]	....
1889	2.18	1899	2.64	1909	7.53

[1] No sales.

This table does not show the full increase of values, because the timber sold in successive years has been more and more remote. The offerings of 1907 could not have been sold in 1880 for anything like the price of the actual sales of 1880. Part of the decline from 1906 to 1909 was due to the increasing remoteness of the timber.

While it is exceedingly difficult to reach even rough conclusions from specific instances, owing to the peculiar influences which may have explained a particular rise in value, in a general way it may be said that stumpage values in the Southern Pine Region increased anywhere from threefold to tenfold during the 10-year period 1898–1908. The advance in the Pacific-Northwest may be roughly stated as about the same, although there were a very great number of instances of more marked advances in value in this region. A great deal of timber in the Pacific-Northwest which to-day has a high value had little more than a nominal value in the late nineties. In the Lake Region the advance has been rather less, say, in general, from twofold to fivefold.

CONCENTRATION OF THE OWNERSHIP OF LAND.

The facts here outlined with respect to concentration of timber ownership involve another problem of possibly even greater magnitude, namely, the ownership of the land itself. After all the timber has been cut from the great private holdings the value of the land alone will be enormous. Much of this cut-over land may be best adapted for new growth, in which case there may be a continuing concentration of timber ownership. A large part of the land, however, will be exceedingly valuable for agricultural purposes. Another important feature in connection with some of the land is the possibility of great wealth in minerals, oil, and gas (although under the terms of the grants mineral lands, except iron and coal, were excluded).

The original Federal grants to the Northern Pacific and to the railroads of the present Union Pacific-Southern Pacific system alone amounted to more than 90,000,000 acres of land; a small empire in itself. Of this, nearly 69,000,000 acres has already been patented and most of the remainder will ultimately be obtained. Much of the land received has, of course, been sold. The Weyerhaeuser Timber Company now owns 1,945,000 acres of land. In Florida 182 holders have 16,990,000 acres of land, of which 4,200,000 acres are owned by only 3 holders. Finally, the timber holdings of the 1,802 holders having each more than 60 million board feet in the investigation area involve 79,092,000 acres of timberland. Practically all that portion of this acreage which lies in the Pacific-Northwest, and, with comparatively unimportant exceptions, all that in the Lake States, is owned in fee. In the Southern Pine Region a considerable proportion is owned by these holders as timber rights; that is, they do not own the land, but have a certain period of years in which to remove the timber. In addition to the above acreage, these holders own in fee 10,652,000 acres of land which lies in the timber sections of the investigation area, but which does not now bear merchantable timber. It is important to note that this figure does not include millions of acres of Northern Pacific and Southern Pacific lands in nontimbered areas. (See pp. 233–236.)

The possibilities of power involved in such a concentration of land ownership, irrespective of the timber, hardly require discussion. The danger of abuse of that power, in the absence of restrictive regulations, is obvious. This danger, moreover, is greatly increased because a few of the largest owners of this land also occupy dominating positions in railroad transportation over great sections of the country.

CHAPTER I.

INTRODUCTION.

Section 1. Importance of the lumber industry.

The total amount of standing timber in continental United States suitable for the manufacture of lumber under present standards in the industry is about 2,800 billion (2,800,000,000,000) board feet, of which about 2,200 billion, or 78 per cent, is privately owned. The statistics of quantity in this Part may be taken as of January 1, 1911, and the text is written as of that date.

The figures given are on mill-output basis and not log scale. A further explanation of the basis of this total of 2,800 billion feet is given on page 65.

The unit of measure of lumber and of the saw timber from which it is made is the board foot. This unit is commonly spoken of as 1 foot square and 1 inch thick. The board foot is so small a unit that price quotations are by the " thousand feet." A large part of the output of lumber is sawed "scant;" that is, of somewhat less than its nominal thickness. Such customs do not, however, affect the estimating of logs or timber. This is a determination, according to conventional rules, of the number of board feet of lumber 1 inch thick which the logs or the timber may be expected to produce. It is not a determination of cubic contents.

The present commercial value of the privately owned standing timber in the country, not including the value of the land, is estimated (though such an estimate must be very rough) as at least $6,000,000,000. Ultimately, the consuming public undoubtedly will have to pay such prices for lumber as will give this timber a far greater value.

The Bureau of the Census reports the output of lumber by sawmills during 1909 as 44,509,761,000 board feet. So far as this figure may be in error, it is probably less than the true amount. Furthermore, there is some consumption of saw timber besides that cut by sawmills. The Forest Service estimates that the yearly drain on the saw timber of the country is about 50 billion board feet. The value at the mill of the lumber, lath, and shingles produced in the year 1909, according to the Census, was about $725,000,000.

Section 2. Scope of the report and special principles involved.

This Part of the report on the lumber industry treats of the amount of merchantable saw timber now standing in the country, the concentration in the ownership of it, and the rapid increase in its value. It also takes up the enormous Federal land grants, especially to railroads, which have been the most important factor in bringing about existing concentration in ownership. Subsequent Parts will present ownership maps and detailed discussions of the concentration in the ownership of standing timber in certain large areas in southwestern Washington, western Oregon, northeastern California, the California redwood belt, north central Idaho, west central Louisiana, the Upper Peninsula of Michigan, and Florida. A marked concentration of land ownership in certain timber regions will also be brought out by this discussion. Also, as an illustration of the ways in which great forest areas have been transferred from the Government to large private holders, it is intended to present maps showing the present ownership of lands eliminated from the forest reserve in the Olympic Peninsula of Washington in 1900 and 1901 and the unwarrantable methods by which that elimination was accomplished. Other parts will deal with the price of lumber, the cost of manufacturing lumber from standing timber, and the competitive conditions in the marketing of lumber.

The trees of the forest are the raw material for the manufacture of lumber. In the trade, standing timber suitable for sawing into lumber is called " stumpage."

The forests of the country, public and private, now contain an amount of merchantable saw timber equal to about fifty-five years' supply at the rate of the present annual consumption. Practically all this, and practically all the timber used up to the present time, has grown without the aid of man. In the course of time, labor and capital will be used to grow trees; but even a period of thirty years would suffice to grow only timber of low quality, and to grow trees of some species as good as those now being used is utterly out of the question commercially, because of the long period required.

In the virgin forest the stand does not increase; growth is balanced by decay. Here and there the timber has been destroyed by windstorms or by fires. Where sufficient time has elapsed, some of these gaps have been so refilled that they can hardly be distinguished from the uninjured forest, and in others reforestation is now going on. In some parts the land cut over by the sawmills and left to the forces of nature is growing another stand of the same species; in other parts the second growth is of inferior species, sometimes unfit for sawing. But the total annual increment to the forest through growth of immature timber in the original forest and of new stands on the cutover land is only a small part of the annual cut; the Forest Service

But mills large enough to operate to the best advantage in the virgin forest under present conditions can not be moved without a loss of the greater part of the investment; consequently, these mills as a rule have logs delivered at one place until the exhaustion of the available timber ends their usefulness.

Logs and lumber are so bulky and heavy in proportion to their value that the facilities for transportation are of primary importance in shaping the conditions in the industry. A large part of the log is waste, and consequently there is great saving in sawing it into lumber comparatively near to its point of origin. In a few localities, such as the Upper Missisippi River region in earlier days and the Puget Sound region to-day, a large amount of timber stands close to cheap water transportation. In such localities, timber in comparatively small tracts may be cheaply logged and transported to any one of a considerable number of mills distributed along the water front; and, therefore, owners of such tracts can sell logs in the market, and the mills can buy current supplies of logs in the water or can buy isolated tracts of timber tributary thereto. But elsewhere either a small mill must be moved from tract to tract or the logs must be transported a long distance by land to a large mill. Under present conditions, it is impossible for a small mill to work far from a railroad, and sell in the general market, because of the expense of hauling out the lumber by wagon. In logging for a large mill, a low cost can be reached only by having a fairly compact tract of timber and building logging railroads through it. Under present conditions, it does not generally pay to build a large mill unless to cut a tract of timber already in possession.[1] The size of the mill is fixed with regard to the quantity of timber available, and is usually made small enough to give a probable life of at least 15 or 20 years, within which the cost of mill and logging outfit, less the removal value, may be written off. After a sawmill is once built some small tracts of timber will usually be tributary to it, and by buying these the life of the mill may be prolonged. Sometimes the cost of shipping logs even so far as 50 or 75 miles may be less than the loss involved in moving or abandoning the mill.

If there were any great gain in concentrating the manufacture of lumber, the cost of transporting the logs even longer distances might be overcome. But there is no such great gain. To enlarge a mill beyond a capacity of 20 or 25 million feet a year is to duplicate mechanical units, with small or doubtful advantage in manufacture, and with certain disadvantage in the cost of transporting logs. It is a matter of dispute among lumbermen whether a mill of 20 million feet capacity, under the usual conditions of transportation in the southern pine territory, is not more economical than a larger one.

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[1] But see pp. 179–180, where it is shown that this is due to the system of timber ownership itself, and not to conditions inherent in logging and manufacturing.

The conditions of the industry tend to keep the bulk of the production in plants of moderate size, say under 25,000,000 feet a year. If a single interest wishes to cut a large amount of timber, it is apt to build two or half a dozen mills, rather than one of extraordinary size. Except in the few localities where cheap and extensive water transportation makes it possible to establish a market for logs, large mills have followed large holdings; the large holdings have not arisen from any advantage of large mills.

The interest on the present value of a supply of standing timber for such a period as twenty or thirty years would be prohibitive, of course, were it not for the rapidly rising value of the standing timber itself. For many years the value of timber has been rising rapidly, so that it has been highly profitable to hold mature timber merely for the increase in price. As a result, capitalists have invested in large holdings of timber. Given the large holding, a rather large mill has apparently some advantage over several small ones of the same total capacity.

Practically all large manufacturers of lumber are large owners of timber. But owing to the profit in merely holding timber, many of the largest holders in the country manufacture either no lumber or an amount in no way commensurate with the amount of timber they own.

Section 5. Distribution of lumber.

A large proportion of the lumber produced—estimated by some as high as one-third for the virgin yellow pine—is sold by the manufacturers direct to large consumers, such as railroads, manufacturers of railroad equipment, and those engaged in the construction of buildings, bridges, and other structures requiring material in large quantities. The rest of the output is sold to wholesalers, brokers, and retailers; for the most part direct from the manufacturer to the retail yards. Many of the large manufacturers are retailers, either directly or indirectly through subsidiary corporations. Some manufacturers own as many as one hundred retail yards scattered through their marketing territory. A company owning many retail yards is called in the trade a " line-yard " company.

The sawmill operator thus acts in three or four capacities: First, owner of the raw material; second, manufacturer; third, wholesale distributor; fourth, retailer.

Effective restraint of trade in distribution of lumber might have arisen from discriminations in freight rates, because of the great weight of lumber in proportion to its value and the consequent importance of any difference in transportation facilities; but any discriminations in freight charges that may have been made were not of such a character as to establish an effective control of the general market by a few favored corporations.

A comparatively small number of retailers handle the trade of a large city, and in the small centers of population there are only one or two retailers. Among such a small number of dealers an arrangement may arise at any time for an effective control, within certain limitations, of prices in the city and its neighborhood. Manufacturers who have many line yards have a strong motive for fostering such local arrangements. The restriction of competition in the retail trade, through the arrangement of prices by local dealers and the division of territory between distributing points, appears in all degrees. Conditions range from total absence of agreement to practically complete pooling, according to local trade conditions, the disposition of the local dealers, and the vigilance of prosecuting officers.

Whatever the conditions in the retail lumber trade, they are connected with conditions in manufacturing only so far as the manufacturers own the retail yards or cooperate with the retailers in establishing trade conditions. In both these ways, however, the manufacturers are to-day a powerful factor in the retail trade over a large part of the country.

Section 6. Excessive profits and power of combination rest on ownership of standing timber.

As shown in section 3, the manufacturing plants are relatively small, and the number of them is correspondingly great. The figures given represent the number of plants and not the number of separate manufacturers. The number of sawmills which single interests may own or control is not shown by the Bureau of the Census, and the question has not been investigated by the Bureau of Corporations because the investigation of the control of standing timber covers the fundamental fact from which the operation of a number of sawmills by the same interest arises. As the economically effective manufacturing plant is relatively small in size and in investment, and as there are no special circumstances in the mere manufacture of lumber from which a combination could easily arise, it follows that any effective combination must rest on some other basis than the merely technical conditions of manufacturing. If there is any condition in the industry to prevent the introduction of competition, that condition becomes the basis upon which those controlling it may combine. Such a potential condition is present in the ownership of the timber. Those who control the standing timber can control the manufacture of lumber; any permanently effective combination in the manufacture of lumber or in the wholesale trade must almost certainly be a combination among timber owners; and to them will go any increase of profit which such a combination may secure.

The importance of control of standing timber is recognized by manufacturers themselves in the common saying, heard even among those who have made fortunes in the lumber industry, that there is no profit in the sawmill, that the profit is in the timber.

Mr. C. A. Smith, of Minneapolis, owner of great tracts of timber in Minnesota and on the Pacific coast, was quoted by a lumber paper in 1910 as speaking of " a mistaken belief that the manufacture of lumber is a profitable business," and adding, " the wealth of the lumberman has been made by an increase in the value of his timberlands.[1]

Mr. W. I. Ewart, of Seattle, in an address before the Pacific Coast Lumber Manufacturers' Association at Tacoma, August 25, 1905, said:

> The actual fact is that the manufacture of lumber in itself has never paid a very large profit; the fortunes which have been amassed by the lumber manufacturer have almost invariably resulted from enhanced values on reserve timberland holdings.

One of the largest timber-owning interests in the country says in its instructions for the preparation of the annual reports for its mills: " Stumpage will be credited as high as the business of the year will reasonably warrant."

The price of timber, like that of any other natural resource, is determined not by cost of production but by the market supply and the market demand. The market demand depends on the desires of consumers. The market supply is the amount the owners offer for sale.

A monopoly price may be exacted for a commodity of limited supply if a comparatively few individuals and corporations own enough to control the market. If the supply of such a commodity is known to be decreasing rapidly, as is actually the case with timber, much of the effect of a commercial monopoly may be produced even though the owners be somewhat numerous and even though no close or formal agreement exist among them. The persons who deal in timber know that its price has risen fast, and they expect that this rise will continue. If much of the supply is in strong hands, able and willing to wait, each will value his timber according to his opinion of the gain to be got by holding it. The strong hands will hold their timber off the market; and though there may be no actual commercial monopoly or combination, the course of prices may be much the same as if there were. As prices go up, the question becomes increasingly important whether timber owners, merely as such, are obtaining extraordinary profits without rendering any corresponding public service. There is the further question whether existing conditions are likely to give rise to a more complete combination of interests owning a large part of the forests, and to a consequent increase of their excessive profits. This Part shows the control of standing timber already accomplished by a relatively few owners; large-scale mergers of some of these great holdings have at times been planned, as in redwood, in cypress, and in southwestern yellow pine. A subsequent Part of this report, on competitive conditions, will further develop this subject in connection with less direct means of restricting competition.

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[1] American Lumberman, Nov. 12, 1910, p. 79.

If the price of lumber can be advanced by the manufacturer, it simply means a higher price for his timber. On a rapidly rising market, the price of timber does not keep pace with the price of lumber, and some extra profit goes to the manufacturer as such. The rise is soon reflected, however, in the price of timber. Speaking broadly, it may be said that the price of timber tends never to fall. A fall in the price of lumber is believed to be only temporary, and the strong timber owner therefore awaits the future profit. Any temporary recession of lumber prices appears as a deduction from the profits of manufacture and is balanced by the excessive profit made on a rapidly rising market. Thus during the boom years ending in the latter part of 1907, the manufacturer as such made high profits, for the price of lumber was considerably in advance of the price of timber. Timber did advance considerably, however, and during the business depression which began toward the close of 1907 there was much complaint that the manufacturers were losing money, because speaking generally timber prices did not fall, and the cost of manufacture was reckoned as including the timber prices established during the preceding boom in the market. Any manufacturer who had bought timber at those prices may have suffered an actual loss, through cutting timber when the margin left for it from the price of lumber was less than the price paid; but nearly all the mills of any importance were cutting timber which they had bought years before at low prices, and were losing only in the sense of making less than the boom had led them to expect.

That great profits should be made by artificially withholding a commodity from use is economically wrong; but such a withholding of the timber, for the very purpose of raising prices and increasing their own gains, is precisely the policy that the great timber owners are proposing. This is illustrated in the following statement by Mr. Leonard Bronson, manager of the National Lumber Manufacturers' Association, which has as its members thirteen associations of manufacturers covering most of the important mills of the country. Mr. Bronson's statement was made in August, 1910, before a meeting of lumbermen on the Pacific coast, a region in which there has been an exceedingly rapid rise in the price of standing timber:

> If I had my way it would be a crime to open another saw or shingle mill on the Pacific coast. There now are 50 per cent more shingle mills than there should be, and the lumber manufacturers here will not have things their own way until the supply of yellow pine is exhausted, which will not be for another decade. At the end of that time the entire United States will look to the Pacific slope for its lumber supply.
>
> The day of cheap lumber is passing, and soon will be gone, but the men who make the money will be those who own timber and can hold it until the supply in other parts of the country is gone. Then they can ask and get their own price.[1]

Mr. Edward Hines, president of the National Lumber Manufacturers' Association, made the following statement in July, 1910, before the semiannual meeting of the Yellow Pine Manufacturers' Association, which is a member of the National:

> I feel, as far as the Yellow Pine Manufacturers' Association is concerned, you have practically got this situation in your own hands. I think it is up to you, gentlemen, to, in a measure, regulate the lumber prices from Kansas City to the Atlantic coast absolutely.[2]

That the members of the Yellow Pine Manufacturers' Association have practically got the situation in their own hands, and that it is "up to" them "to, in a measure, regulate the lumber prices," means the same as Mr. Bronson's suggestion; namely, that they can raise the price of lumber, and so increase their gains from their timber holdings, by restricting lumber production. The same idea is brought out in the following statement made at the annual meeting of the National Lumber Manufacturers' Association in April, 1910, by Mr. J. L. Thompson, president of the Yellow Pine Manufacturers' Association:

> Recently we had a little meeting over at Memphis. We had 70 billion feet in a room about the size of this room here. We all realized that there was only one evil. We took a vote on what was the cause of our troubles—"overproduction." Every solitary man agreed on that, and everybody was willing to suggest a remedy; everybody knew what the remedy was.[3]

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[1] Mississippi Valley Lumberman, Aug. 12, 1910, p. 33, column 3.

[2] Official Proceedings of the Fifth Semiannual Meeting of the Yellow Pine Manufacturers' Association, p. 9. Also, American Lumberman, July 23, 1910, p. 56, column 2.

[3] Official Report Eighth Annual Meeting of the National Lumber Manufacturers' Association, held in New Orleans, La., Apr. 19 and 20, 1910, p. 126. Also, American Lumberman, Apr. 30, 1910, p. 44, column 3.

" Overproduction " evidently means that the current cut of lumber, and the resulting prices, were such that the owners were not getting so much as they desired for their standing timber, though the value of standing timber had doubled, trebled, or quadrupled, in 10 years or in less. The remedy which everybody was willing to suggest is obviously the policy advocated by Mr. Bronson and Mr. Hines—restriction of lumber production.

Mr. Thompson recognized that the power of a given set of men to restrict lumber production, and so to raise lumber prices, is not in proportion to the amount of lumber that they cut, but in proportion to the amount of standing timber that they control. He measured the weight of men in this connection, not by their importance as manufacturers, but by their importance as timber owners. "We had 70 billion feet;" that is, the owners of 70 billion feet of standing timber.

Therefore, in any consideration of what tendencies exist toward a unified control of the lumber business, the fundamental point is the extent of the tendency toward a unified control of the standing timber. Any combination elsewhere would be wholly under the dominion of a combination here, and if the timber were controlled it probably would be a matter of subordinate consequence how many separate interests might divide the manufacture and the distribution of the lumber.

Section 7. Necessity of a comprehensive investigation.

Previous to the present investigation the Government and the public had no data regarding the degree of concentration in the ownership of the standing timber of the country. The individual facts, particularly the relations of nominally distinct owners, individual and corporate, are of such a character that only an incisive investigation gets them; and nothing short of a very systematic and thorough handling of the detailed information gives a conclusive presentation of the general conditions. Absolutely no such inquiry had ever been attempted.

In determining the degree of concentration it was necessary to ascertain the amount owned by each large holder and also the total owned by all holders.

The total amount of standing timber in the country, even without regard to ownership, had never been made the subject of a serious and detailed inquiry. Prior to the present investigation, nothing like a census of timber had ever been taken for any considerable part of the timber area. Such detailed data as the Bureau of the Census had gathered had related only to timber reported by sawmills. Excepting a few areas, all inquiries made by the Government regarding the amount of privately owned timber had been fragmentary and admittedly of little value, and the general estimates made by Government bureaus and by private individuals were based on the roughest calculations. Consequently, there was great uncertainty and difference of opinion regarding the available supply.

This question is very important, entirely apart from the need of the data in connection with the investigation of the industry by the Bureau of Corporations. The public needs the information in determining its policy toward the national forests and toward the private holdings. The lumbermen have urged the Government to make an investigation of the total amount of timber for the guidance it would give the private owners in the management of their properties.

In May, 1907, the National Lumber Manufacturers' Association passed a resolution stating that "in view of our rapidly decreasing forest resources, it is of the greatest importance that an accurate determination be made of the kind and quantity of standing timber in the United States in order to secure a sound basis for plans for forest management and utilization,"[1] and requesting that this work be undertaken by the Forest Service and the Bureau of the Census. Other lumber associations passed similar resolutions. In January, 1908, at the hearing on the subject before the House Committee on the Census, the Forester and the Director of the Census asked for $250,000 for the work. At the same hearing Mr. George K. Smith, secretary of the National and also secretary of the Yellow Pine Manufacturers' Association, urged that the work be undertaken, and, in the course of his statement, said:

> The manufacturers of lumber have had this matter on their mind for a great many years. Four years ago, when we came here to the large forestry congress that was being held, the question was started, and we have been agitating it ever since.[2]

In Forest Service circular 97, issued April 24, 1907, and entitled "The Timber Supply of the United States," the estimates of the total timber made since 1880 are discussed as follows:

> It must be said at the outset that no authoritative estimate can be made at the present time, since the magnitude of the task and the many difficulties involved have hitherto prevented the gathering of the necessary data.
>
> * * * * * * *
>
> The principal estimates of the stumpage of the United States which have been made since 1880 are given in Table 4.[3] The first is that presented by Sargent in Volume IX of the Tenth Census. This estimate, in addition to being too low for almost every species considered, with the possible exception of the hardwoods, is notable for its omission of the timber which exists to-day in greater quantity than any other—Douglas fir—and also for the

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[1] Hearings before the Committee on the Census, House of Representatives, 1st session, 60th Congress, p. 4.

[2] Ibid., p. 26.

[3] Here printed on pp. 43 and 44.

omission of western yellow pine, another important species. The next estimate is that of Hotchkiss, published in his "Lumber and Forest History of the Northwest" in 1898. He does not go into details, but simply estimates that the total stumpage is 1,400 billion feet, of which the Northern States have 100 billion, the Southern States 300 billion, and the Pacific States 1,000 billion feet. Next are the estimates prepared by Gannett and published by the Twelfth Census in Bulletin 203. These are the most carefully prepared estimates yet made and have been widely quoted. In addition to bringing the figures for several species up more nearly to the probable stand, these estimates also cover Douglas fir, western yellow pine, and sugar pine, which were omitted in the census of 1880. The next estimate is the one made by Fernow in 1902 and published in his "Economics of Forestry." Like that of Hotchkiss, this is also a regional estimate, the stumpage of the Northern States being placed at 500 billion feet, that of the Southern States at 700 billion, and that of the Western States at 800 billion, a total of 2,000 billion feet and the highest of any given in the table. It may be noted in passing that in a previous estimate published in 1896, in Circular No. 11 of the Division of Forestry, Fernow placed the total stumpage of the country at 2,300 billion feet, which, upon further consideration, he evidently considered too high. At the thirteenth annual meeting of the Southern Lumber Manufacturers' Association, in New Orleans, January, 1903, R. A. Long read a paper upon "Stumpage," in which the figures given in the fifth column of Table 4 were presented. Long's estimate does not cover cypress, sugar pine, or hardwoods. Its principal point of interest is that it differs so radically—about 38 per cent—from that of the census of 1900 upon the stumpage of southern yellow pine. The last estimate given in the table is that published in the American Lumberman, September 23, 1905. It is based primarily upon census data, with the addition of some species and with increased figures for others.

ESTIMATES OF STUMPAGE OF THE UNITED STATES.

[NOTE BY BUREAU.—These estimates were made prior to the present investigation.]

Kind of timber.	Census, 1880.	Hotchkiss, 1898.	Census, 1900.	Fernow, 1902.	Long, 1903.	American Lumberman, 1905.
	M board ft.	*M board ft.*	*M board ft.*	*M board ft.*	*M board ft.*	*M board ft.*
White pine	87,755,000	....	50,000,000	....	60,000,000	....
Eastern and northern pine	....	....	....	....	....	55,000,000
Southern yellow pine	237,141,500	....	300,000,000	....	187,250,000	300,000,000
Eastern spruce	12,265,000	....	50,000,000	....	18,221,000	75,000,000
Eastern hemlock	20,165,000	....	100,000,000	....	56,571,000	100,000,000
Douglas fir	....	....	300,000,000	....	260,000,000	350,000,000
Western yellow pine	....	....	125,000,000	....	138,000,000	250,000,000
Cypress	[1] 2,153,600	....	65,000,000	....	....	65,000,000
Redwood	25,825,000	....	75,000,000	....	75,000,000	75,000,000

[1] Florida and Alabama only.

ESTIMATES OF STUMPAGE OF THE UNITED STATES—Continued.

Kind of timber.	Census, 1880.	Hotchkiss, 1898.	Census, 1900.	Fernow, 1902.	Long, 1903.	American Lumberman, 1905.
	M board ft.	*M board ft.*	*M board ft.*	*M board ft.*	*M board ft.*	*M board ft.*
Cedar	22,800,000	....	....	....	27,640,000	....
Sugar pine	....	....	25,000,000	....	....	50,000,000
Other conifers	12,500,000	....	....	....	....	250,000,000
Total conifers	420,605,100	....	1,090,000,000	....	822,682,000	1,570,000,000
Total hardwoods	435,685,000	....	300,000,000	....	....	400,000,000
Region:						
Northern States	....	100,000,000	....	500,000,000	....	....
Southern States	....	300,000,000	....	700,000,000	....	....
Western States	....	....	....	800,000,000	....	....
Pacific States	....	1,000,000,000	....	....	....	....
Total	856,290,100	1,400,000,000	1,390,000,000	2,000,000,000	822,682,000	1,970,000,000

* * * * * * *

> It should be remembered in comparing the estimates of 1880 with recent ones that the total cut since 1880 has been over 700 billion feet, of which at least 500 billion feet have been conifers, or 80 billion feet more than the total coniferous stumpage covered by the census of 1880.

The Twelfth Census (1900) gathered no data regarding the amount of standing timber except that reported by sawmills as owned by them. No special effort was made to verify or correct the returns, and the experience of the Bureau of Corporations has shown that such effort is absolutely necessary for reasonably accurate results. Furthermore, the timber owned by a sawmill company may be only a fraction of the timber owned by the same interest. For instance, the Weyerhaeuser Lumber Company operates a sawmill, but owns very little timber; while all its capital stock is owned by the Weyerhaeuser Timber Company, the second largest holder of timber in the United States, which saws no lumber. The total amount of timber reported by the Twelfth Census as owned by sawmills was 215 billion (215,550,000,000) feet.[1] Such estimates as were made by the Twelfth Census on the total amount of standing timber were not based on statistical detail, but were simply the best opinions that could be drawn from the general information then available. The Census of Manufactures, 1905,[2] reports the amount of timber owned by sawmills at 257 billion feet, and for some of the species gives about the same general estimate of the total in the country as appeared in the Twelfth Census. The uncertainty with which these estimates were made is shown by the following quotation from the Twelfth Census regarding cypress:

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[1] Twelfth Census, Vol. IX, p. 828.

[2] Part III, p. 639.

> Little is known of the amount of this timber, though it is of great value. The total amount reported as owned by lumbermen [sawmills] was 6,562 million feet, and this is probably but a small fraction, probably not more than 10 per cent, of the total stand.[1]

The Census of Manufactures, 1905, made exactly the same statement, except that the cypress owned by lumbermen was given at 8,847 million feet.[2] The estimates for cypress made by other writers through the use of these figures and the 10 per cent were far too high—the figure established by the present investigation is 40.4 billion (40,400,000,000) feet (see p. 113)—while the estimates made by the Census for other species were far too low.

In December, 1908, the Bureau of Corporations made a preliminary estimate of the total privately owned standing timber in the region investigated by it, and this figure, together with estimates by the Forest Service for the rest of the privately owned timber and that publicly owned, made a total of 2,500 billion board feet in continental United States; and this figure has since been used in Forest Service circulars and some other publications.

The estimate of the total standing timber in continental United States on January 1, 1911, made as a result of the investigation by the Bureau of Corporations, is 2,800 billion (2,800,000,000,000) board feet. Not allowing for the timber cut during the intervening years, this is more than twice the estimate shown for the Twelfth Census in the above quotation from Forest Service circular 97, and is 40 per cent above that credited to Fernow. These are the only estimates with sufficient basis to make comparison worth while.

Section 8. Nature of timber estimates.

The determination of the amount of standing timber on a given area is a matter of far greater difficulty than is likely to be assumed by persons who have not been concerned with the question. To show what the difficulties are, the methods of measuring and estimating timber must be set forth in some detail.

Measurements of lumber and logs.—As already stated, measurements of lumber and timber in the United States are commonly made in terms of board feet. While 12 board feet make 1 cubic foot, a tree which contains 200 cubic feet of wood will make only a small fraction of 2,400 board feet of lumber. A large part of the wood—

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[1] Vol. IX, p. 831.

[2] Part III, p. 643.

all the branches and the upper part of the trunk—is not suitable for lumber, and there is always some loss in the stump. But the lumber produced is far less than 12 board feet for every cubic foot of logs suitable for sawing. The slabs, removed in squaring the log, are wholly or largely wasted; the sawdust is wasted; there is a waste because of the difficulty of sawing true; and there may be further losses on account of internal defects in the log. Each of these losses varies widely. The slabs are a larger proportion of a small than of a large log, and a much larger proportion of a crooked log than of a straight one. The waste from defects depends upon the quality of the timber, and also on the size of the pieces sawed out; for a defect which is hidden in a heavy timber or even in a 3-inch plank may come to light in a board. The waste from the difficulty of accurate sawing varies with the wood, with the character of the mill, and with the skill of the sawyer. The waste from sawdust varies with the thickness of the saw and with the size of the lumber made. Some large circular saws take out a kerf three-eighths of an inch wide, or even more. Smaller ones may take one-fourth of an inch. Many band saws and gang saws work on one-eighth or little more. A few are said to cut as little as one-sixteenth.

With a saw that takes out a quarter-inch kerf, a thickness of an inch and a quarter is required for getting out a 1-inch board; one-fifth is lost in sawdust. If 2-inch plank are sawed, the waste is only one-ninth; if timbers, say 12 inches square, the kerf is unimportant.

The contents of logs are reckoned by lumbermen in board feet. For this purpose, however, the contents are not the full volume, but the quantity of lumber that a log may be expected to make. As has been shown in the preceding paragraphs, the product depends on many things besides the length and diameter of a log. At different mills, and under different circumstances, the product of exactly similar logs may vary materially; and at the same mill, and under the same circumstances, one log may produce considerably more than another whose gross cubic contents are the same. The measurement or "scaling" of logs, therefore, is not a mathematically accurate determination of their volume, but an approximate determination of the quantity of lumber they are likely to yield.

For this purpose, lumbermen commonly use a measure called a log scale or scale stick. This is a flat stick, a quarter of an inch or more in thickness and about an inch and a quarter broad. The edges are often graduated in inches. On the faces are usually six graduations, three on one and three on the other, for six lengths of logs. These graduations run lengthwise of the stick, and show the contents in board feet, at each diameter, for logs of each length. The length of a given log is first determined, usually by the eye; the stick is then laid across the small end, and the contents in board feet are read off.

The reading is supposed to give the contents of a straight, sound log; and if a log is crooked or unsound, the scaler makes a deduction according to his judgment. The measuring sticks are graduated according to tables, called log scales or log rules, which give the supposed product of logs of different diameters and lengths. Many such tables have been constructed; some from diagrams, some by mathematical formulæ, some by measurement of logs sawed and their product, and some by combinations of these methods. The Woodsman's Handbook, published as Bulletin 36 of the Forest Service, gives 44 different rules.[1] The differences among them are astonishingly wide. For a 16-foot log, 24 inches in diameter, the computed contents range from 268 board feet to 500; for a 12-foot log, 6 inches in diameter, from 3 board feet to 20.[2]

For a log 12 feet long and 6 inches in diameter, most rules give values ranging from 12 feet to 20. Yet the Doyle rule, which gives only 3 feet, is more widely used than any other. It is far more inaccurate for small logs than for large, yet in great areas of the country it is used for small logs only. There is another rule of long and wide acceptance, the Scribner, which gives smaller values than the Doyle for the larger diameters and much larger values for the smaller diameters. A combination of the two has been made, by taking the smaller value for each size of logs, with very few exceptions. This combination, called the Doyle-and-Scribner rule, is the scale chiefly used in many parts of the Eastern, Southern, and Middle-western States. Mills which use the Doyle or the Doyle-and-Scribner rule, and which cut small logs, often have an "overrun" of 20, 30, sometimes, with thin saws, of 40 or 50 per cent; that is, their actual product of lumber exceeds by so much the scale of the logs they saw.

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[1] Issue of Nov. 22, 1910.

[2] The values of 268 feet and 500 feet for a log 16 feet long by 24 inches in diameter are given by the Cumberland River Rule and the Baughman Band Saw Rule, respectively; the values of 3 feet and 20 feet for a log 12 feet long and 6 inches in diameter by the Doyle Rule and the Square-of-three-fourths Rule, respectively. These figures, and the following statements regarding the rules named. are taken from the Woodsman's Handbook, Bulletin 36 of the Bureau of Forestry, Part I, revised edition, 1903.

The Cumberland River Rule is based upon the following formula: Deduct one-third from the diameter at the small end inside the bark to reduce the round log to square timber. Then from one side of the square thus obtained deduct one-fifth for saw kerf; multiply the remainder by the side of the square and the product will be the contents of a log 12 feet long. For logs of other lengths multiply by the length and divide by 12. (Woodsman's Handbook, pp. 49, 50.)

The Baughman Band Saw Rule was based upon diagrams drawn for logs of different sizes, and the table thus secured was corrected by the author of the rule from his experience in manufacturing lumber. (Woodsman's Handbook, p. 53.)

The Doyle Rule is used throughout the entire country and is more generally employed than any other rule. It is constructed by the following formula: Deduct 4 inches from the diameter of the log as an allowance for slab; square one-quarter of the remainder and multiply the result by the length of the log in feet. It was originally intended that in the use of this rule the average diameter of the log should be taken, but the usual custom is to measure the diameter inside the bark at the small end. (Woodsman's Handbook, p. 38.)

The Square-of-three-fourths Rule is based upon the following formula: Deduct one-fourth of the diameter at the small end of the log inside the bark for saw kerf and slab, square the remainder, multiply by the length of the log, and divide this last product by 12 for the contents in board feet. (Woodsman's Handbook, p. 51.)

Usually the timber owned by a sawmill will give quite uniform results when handled under the same conditions. Defects are characteristic not only of the species but also of the district where the trees grow, and by keeping records comparing the actual yield with the scale of the logs it is possible to determine the approximate relation between the two. The mill may thus compute the average overrun shown by its experience, and then reckon that its logs will in all likelihood yield approximately the same percentage above the scale.

Estimating standing timber.—It has perhaps been made clear enough that many uncertainties are involved in the scaling of logs. Even aside from the element of individual judgment, in allowing for defects, the mere application of the rules to straight and sound logs gives results which only approximate the product of the saw.

The estimating of standing timber introduces further difficulties. The ideal of accuracy, from the standpoint of the "cruiser" making the estimate, would be to reach the same result that would be reached, after the trees were felled, by the scaling of the logs. As just shown, this ideal falls far short of an accurate measure of the resultant lumber; but this very imperfect ideal is not approached in most estimates of standing timber. It can be approached by detailed calculation. Every merchantable tree can be counted, its diameter measured, and even its height. There may still be shrinkages between tree and log that can not be determined beforehand. There may be concealed hollows; in some species, as cypress, there will be many. There may be much breakage in felling; this is a heavy loss in redwood. But, waiving such points, counting and measuring are enormously expensive, and such a method is hardly ever used in practice. Even if the trees are counted, the average diameter is usually estimated by the eye, and the supposed normal content of the tree of this diameter is multiplied by the number of trees. This normal content is based on the estimator's experience or on volume tables. Even the counting of trees is not only slow and expensive, but difficult. It is hard to be sure of getting them all and counting none twice.

Oftener no attempt is made to count every tree, but sample plots, perhaps of an acre each, are laid off by pacing or with a surveyor's chain, and the trees on them are counted. The result is taken as the average stand on the larger area which the samples represent.

Far the commonest method of estimating, however, is simply to look the forest over, without any counting or measuring. The examination may be made with less or greater care. The cruiser may tramp back and forth on parallel paths only a few rods apart, or he may make only one trip through a strip a mile wide. He may tramp all day without making a note, and set down at night his estimate of the area he has covered and of the whole amount of timber he has passed through.

By long experience, men learn to form judgments, by these rough methods, which, on an average, approximate fairly the scale of the logs. The general tendency is to estimate below the truth, because the estimator desires to be "safe;" that is, not to have his estimate subsequently proved too large by other cruisers or by the results at the mill. To overestimate reflects on the cruiser. The owner will not complain if the cut shows more timber than the estimate, but he will be displeased—especially if he bought on the estimate—if the cut shows less.

Moreover, an estimate which is accurate according to the customs of one time will be inaccurate according to those of another, because the standards of merchantable timber change. With higher prices for lumber, more logs are brought to the mill from the same tract and more board feet of lumber are made out of the same log, because the manufacturer is able to sell some low-grade lumber not previously marketable. Again, some species formerly regarded as worthless and not included in estimates become valuable with higher prices and increase the estimates of merchantable timber by their amount. This has been true of every timber region in the past, and as values rise and timber is cut closer in the future, estimates will rise far above those which are used to-day.

If two estimates of the same tract, made at the same time, do not differ more than 10 per cent, they agree quite as closely as can be expected. Good estimators often differ 25 per cent, and sometimes even 50 per cent. An important tract of pine in northern Minnesota was examined by three companies in 1909, with a view to purchase. One estimated it at 125,000,000 feet, and another at 135,000,000. The seller's estimate was 170,000,000, and on this basis the third company bought it. The purchase was made, however, against the opposition of a member of the buying company, who is reputed to be one of the best timbermen in Minnesota, and who estimated the tract at from 95,000,000 to 110,000,000. The accepted estimate exceeded his by more than 50 per cent, and if the mean of his figures be taken as representing his opinion the independent estimates of other prospective buyers exceeded his by 20 or 30 per cent.

The following table shows the average results, by years, of two series of estimates—first, those made by a company in the North Carolina pine region for purposes of purchase; second, those made by the State of Minnesota, on timber owned by the State, for purposes of sale. The quantities given as cut represent the scale of the logs; the quantity of lumber actually sawed was materially greater.

TABLE 2.—ESTIMATED AMOUNTS OF TIMBER ON CERTAIN TRACTS, CLASSIFIED BY YEAR OF PURCHASE, WITH THE AMOUNTS CUT THEREFROM.

Year.	Timber bought by a southern company.			Timber sold by the State of Minnesota.		
	Estimated.	Cut.	Cut, per cent of estimate.	Estimated.	Cut.	Cut, per cent of estimate.
	M feet.	*M feet.*		*M feet.*	*M feet.*	
1886	....	....	....	24,540	37,859	154.3
1887	....	....	....	40,472	34,021	84.1
1888	....	....	....	20,400	27,488	134.7
1889	....	....	....	33,040	49,952	151.2
1890	....	....	....	52,130	63,681	122.2
1891	....	....	....	78,710	176,784	224.6
1892	....	....	....	29,135	72,680	249.5
1893	....	....	....	23,795	36,791	154.6
1894	....	....	....	33,870	42,856	126.5
1895	2,550	3,774	148.0	27,403	41,010	149.7
1896	460	1,249	271.5	2,600	1,758	67.6
1897	41,075	53,508	130.3	51,322	68,598	133.7
1898	25,648	31,718	123.7	30,643	42,688	139.3
1899	29,355	37,198	126.7	4,035	3,484	86.3
1900	4,575	5,997	131.1	69,128	71,958	104.1
1901	4,485	5,539	123.5	25,400	29,565	116.4
1902	4,550	5,487	120.6	52,710	53,922	102.3
1903	3,505	3,525	100.6	70,875	82,045	115.8
1904	24,936	23,534	94.4	32,900	36,718	111.6
1905	10,142	9,556	94.2	68,078	105,970	155.7
1906	10,085	9,917	98.3	26,705	47,227	176.8
1907	590	824	139.7	22,795	27,105	118.9
1908	1,200	1,353	112.8	(1)	....	....
1909	2,985	3,426	114.8	2,165	5,541	255.9
Total	166,141	196,605	118.3	822,851	1,159,701	140.9

[1] No sales.

The southern company usually paid a lump sum for a tract, and the prices it offered were fixed on the basis of its estimates. It would try to get a fair idea of the timber it was buying, but would wish to err rather on the conservative than on the liberal side. The State of Minnesota did not sell its timber at so much for a tract, but at so much a thousand, and the payments were determined by the quantity of logs scaled.

Some of the earlier purchases of the southern company stood several years between buying and cutting, and if the timber was immature the quantity may have increased somewhat by growth. This element is believed to have been of minor importance, however, and it does not enter in the case of the Minnesota timber. That was usually cut within two or three years after the estimate was made; and in any case the timber was mature, and the decay of the old trees probably balanced the growth of the young.

Under these circumstances, the scale of the logs from the Minnesota timber, taking all the sales of each year together, was usually from 10 to 60 per cent above the estimate, with an average of 40 for the whole. The sales of 1896 cut only two-thirds of the estimate; those of 1892 and 1909 cut 2½ times the estimate.

In the case of the southern company, reckoning its purchases by annual aggregates, the purchases of most years, so far as they have been cut, have produced logs exceeding the estimates by from 10 to 40 per cent, with an average of 18 for the whole. Three years show a shortage of from 2 to 6 per cent, and one rather small lot went above 2½ times the estimate.

The variation is greater on particular tracts than on yearly aggregates. The following table shows the estimates and the scale of the logs, in detail, for the several tracts bought by the southern company in 1909:

TABLE 3.—ESTIMATED AMOUNTS OF TIMBER ON CERTAIN TRACTS, BOUGHT BY A SOUTHERN COMPANY IN 1909, AND THE AMOUNTS CUT THEREFROM.

Estimated.	Cut.	Cut, per cent of estimate.	Estimated.	Cut.	Cut, per cent of estimate.
M feet.	*M feet.*		*M feet.*	*M feet.*	
75	80	106.7	675	443	65.6
40	35	87.5	200	161	80.5
20	15	75.0	425	500	117.6
550	1,059	192.5			
1,000	1,133	113.3	2,985	3,426	114.8

On the whole year's purchases the scale of the logs varied only 15 per cent from the estimates; but on particular tracts the result ranged from 34 per cent below the estimate to 92 per cent above.

The following table, except the percentages, is taken from the report of the Commissioner of the General Land Office for 1910, page 15. It gives the results of logging on ceded Chippewa lands in Minnesota, grouping the tracts according to date of sale. Payment is based on the amount actually cut.

TABLE 4.—ESTIMATED AMOUNTS OF TIMBER ON CERTAIN CEDED CHIPPEWA LANDS IN MINNESOTA, GROUPED BY DATE OF TIMBER SALE, WITH THE AMOUNTS CUT THEREFROM.

Date of sale.	Government estimate.	Cut.	Cut, per cent of estimate.
	M feet.	*M feet.*	
March 2, 1903	13,636	26,816	196.7
December 5, 1903	223,921	308,637	137.8
December 28, 1903	169,308	296,155	174.9
November 15, 1904	146,560	168,113	114.7
November 17, 1904	9,718	18,786	193.3
July 17, 1907	2,056	3,754	182.6
March 15, 1910	2,169	2,189	100.9
Total	567,368	824,450	145.3

On the whole quantity the log scale exceeded the estimate by 45 per cent. On the tracts sold November 17, 1904, and on those sold March 2, 1903, the log scale was nearly double the estimate.

Professional cruisers keep as well informed as possible on the relation between their estimates and the results shown in cutting the timber, and thus modify their judgment with experience. This is especially true in the first years of their work as cruisers, or when going from one timber region to another of very different character, or during periods of marked change in the standards of merchantable timber. On first going from the Lake States to the Pacific coast, cruisers made estimates far below the truth, because the stands per acre were so enormous that men accustomed to eastern stands could not grasp or accept them. It is only during recent years that estimates for western timber have been made close to the actual yield.

Section 9. Methods followed in the investigation.

In the preceding section, the effort has been made to show how far from exactness is the art of estimating timber. Even when the estimates are made with what is considered reasonable care, for the purpose of purchase or sale, they are uncertain. In naming offhand the probable contents of a tract which he has never carefully examined but has only a general knowledge of, a man will of course do worse, on an average, than in giving an estimate on a tract which he has just examined for the purpose. The most experienced lumberman can know but a comparatively small area by careful examination. When he undertakes to make a general estimate for a district, even for a few townships, he must usually depend partly on general observation and partly on the opinions of others.

Most individuals and corporations owning important tracts have had fairly good estimates of their timber made, either recently or in earlier years, and in the latter case they usually have a fairly definite opinion, based on the results of cutting or on general information, regarding the per cent by which the old estimate should be increased to make it approach present-day standards of merchantable timber. The owners of timber, cruisers, loggers, timber dealers, and the responsible employees of timber and lumber companies are often well acquainted with the approximate amount of timber in holdings other than those in which they are directly interested, and also well informed regarding the probable total amount of timber in certain survey townships or other subdivisions of a county, or in the county as a whole. Thus, there exists in the records of timber owners and in the minds of men a basis for arriving at the approximate amount of timber in a State and in the country. The accuracy of the results which may be obtained from these sources depends largely on the willingness and truthfulness with which the informants give the information they possess, and on the perfection of the methods by which this information is gathered in detail by small areas and is studied.

The only better method would be a careful examination of the timbered area by public officers. The result would still be a collection of opinions, not of mathematical determinations; but the opinions would have more value, other things being equal, in proportion as they were based on more careful and detailed examination of the timber. By the expenditure of time and money, they might be raised to any degree of accuracy, up to the point where they should represent a count and measurement of every tree.

A count and measurement of all merchantable trees, however, or even a count without measurement, would, of course, not be thought of. Such work is so expensive that most timber is bought and sold without it; and a procedure which men can not afford to use for their guidance in buying and selling is far too expensive for any statistical inquiry. The only proposal which could be thought of would be an estimate by general observation, perhaps supplemented, where the forest was practically unbroken, with a count on sample tracts. The cost of such an estimate would vary with the minuteness of it, but the roughest canvass that would be worth making would be a matter of some millions of money and some years of time. Even if money were unlimited, it is not likely the work could be tolerably well done in ten years for lack of men. The estimating of timber is an art acquired by much practice. The men skilled in it are few, and they are employed in current business. They could hardly be diverted in the necessary numbers to an official investigation. Furthermore, such a plan would give information on the total amount of timber only and nothing regarding the ownership of it. To provide such data, it would be necessary to first obtain records of the ownership, and then to make the observations separately for each holding, which would greatly increase the expense and the time.

METHODS ADOPTED.—The problem before the Bureau of Corporations was to provide a plan which would give, within reasonable expense and time, as accurate information as the nature of the problem allowed regarding all large holdings separately, and regarding the scattered small holdings as a whole, in order to determine the proportion between the timber owned in holdings of certain specified sizes and the total timber in the country. Under the plan adopted, the investigation of the amount of timber in all small holdings proceeded side by side with the investigation of the essential facts regarding large holdings, in such a way that the latter checked and contributed to the former.

The work was guided by the following principles:

1. The available resources would not permit the employment of estimators with a view to the examination of timber. Any estimate must therefore be based on data already existing, in records or in the minds of men.

2. The estimate of the timber on each area should be derived from the records or the opinions of those most familiar with it, and as many records and opinions as possible should be obtained regarding it, in order to give a constant check on the work and to enable the Bureau to arrive at the best estimate from a thorough study of all the available evidence in detail.

3. A separate report should be made for each holding of 60 million board feet or more. Information regarding each such holding should be obtained from as many sources as possible.

4. For the total timber in holdings of less than 60 million board feet, the best local evidence must be relied on. Estimates should be obtained for the smallest possible units of area, and the opinions of each authority should have special weight for the neighborhood which he knows best.

There is no special significance in the limit of 60 million. It was necessary to waive the separate reports at about that point in order to save time.

The schedule used in reporting holdings of at least 60 million feet is shown on page 275.

The Bureau soon found that it had not money to cover the whole country. Congress made no special appropriation for the lumber investigation, and the work had to be done, along with all the other investigations of the Bureau, under the usual annual appropriation. The Bureau therefore narrowed the area to be investigated to the Pacific-Northwest, the Southern Pine Region, and the Lake States. (See sec. 10 for specific description of these regions and for the reason for their selection.)

A few reports were obtained by mail, but for nearly all owners the schedule was filled by special agents of the Bureau visiting the informants. With regard to the amount of timber, the essential items are these: The number of acres, the exact location of the land, and the detailed estimate called for under question 9 of the schedule; and all the facts, called for under question 8, which would enable the Bureau to judge the accuracy of the estimate. All States of the investigation area except Virginia, North Carolina, South Carolina, Georgia, and Texas are surveyed under the rectangular-survey system, and there it was possible to show the exact location of the timber holdings by the use of such township outlines as those printed on pages 5, 6, and 7 of the schedule. In Virginia, North Carolina, South Carolina, Georgia, and Texas, maps or blueprints showing the exact location of the land were obtained wherever available, and other holdings were located descriptively as accurately as possible by political subdivisions of the county and by the relations of the holdings to towns, railroads, streams, etc. The largest holders in these States usually have maps showing the exact location of their lands. In the rectangular-survey States, the agents did not secure the exact location in every case, and a relatively few holdings were located only by counties or as in certain survey townships; but in nearly all cases the exact location was obtained.

The first seven questions of the schedule called for general information regarding the owner and connected interests in the lumber or timber business. Question 7 covered the interrelations of timber owners through stock in corporations, and this question met persistent opposition on the part of informants. A few corporations furnished full information, but in general it must be said that this question has not been answered. For a further discussion of this point, see page 95.

Field work was begun by sending agents into the lumber centers, which are the headquarters of many of the largest owners of standing timber. The reports from them were tabulated by counties, showing for each holder in the county the number of acres, amount of timber, and stand per acre, and the land was platted on county maps with a different symbol for each holding. In the five States without the rectangular survey, the location of holdings could be shown exactly wherever blueprints or maps had been furnished, and in other cases only descriptively. With these records of information already obtained, an agent of the Bureau was sent into every one of about 900 counties in the investigation area. His instructions were to seek out every reliable local informant and secure all available information that would verify or correct the reports already obtained, to secure a separate report on each remaining holder in the county who had as much as 60 million feet in the United States, and to secure data in as much detail and from as many different sources as possible regarding the total timbered acreage and the amount of timber in all holdings not separately reported, including the small scattered tracts sometimes referred to as "farmers' woodlots." By adding the holders separately reported, as he obtained them, to the county map above mentioned, the agent was able to proceed systematically in obtaining data regarding all land within the timber line of the county. For many of the counties in the Southern Pine Region and in the Lake States it was not practicable to obtain these estimates on the timber in the county or subdivisions of it, such as survey or political townships, exclusive of the reported holdings of at least 60 million feet. In such counties it therefore became necessary to secure the estimates on the total timber in the county or a subdivision of it, and then to obtain the amount in holdings of less than 60 million by subtracting the total timber reported in holdings of that amount or more. This was especially true in the five States not having the rectangular survey. But in the five States of the Pacific-Northwest, containing the great supply of timber, the estimates of the total in holdings not separately reported were obtained almost without exception by the use of maps showing the location of reported holdings. The informants, with these maps before them, made general estimates on the timberland not so platted.

All holdings of less than 60 million feet for which separate information was easily available, or which were made the subject of inquiry through belief that they might be above the limit, were separately reported, and were then tabulated and platted like the larger holdings. The proportion of the total timber in holdings of less than 60 million thus separately reported is very high in some States, and this increases the accuracy of the work.

For the timber in holdings of at least 60 million feet, the primary reliance was on the estimates of the owners or their representatives. But these estimates were not treated as necessarily conclusive. Many of them were made years ago, and omitted kinds or sizes of trees that were not then accounted merchantable, but are so accounted now. Many were admittedly only rough approximations. A very few owners, especially such as have borrowed money on their timber, were disposed to claim more than they possessed; very many holders did not wish the Bureau to know how large their holdings were. Some purposely gave erroneous information; others avoided the issue by giving access to old records which did not show the amount of timber under present standards, and withholding more recent records and facts within their personal knowledge. Agents were instructed to watch for errors from all these causes and to gather such evidence as might be available for correcting them. The owner's estimate was taken as prima facie evidence of the amount of his holding, but it was checked, wherever possible, with the estimates of other competent persons, such as former owners, timber estimators who had examined the tract, business associates, and others.

While the platting of the land owned by each holder and the replatting of it on county maps required a great deal of time, the work was absolutely essential to the investigation. An informant who would have understated the acreage owned was deterred therefrom by having to show its location. Through the use of the plats, other men could be interviewed regarding the amount of timber on the holding or such subdivisions of it as they were familiar with.

Occasionally land not reported by the owner but otherwise indicated as owned by him could be added through further inquiry and the owner's supplemental statement. Again, the use of plats prevented duplication, and made it possible to say positively that a holding reported under one name was or was not the same, wholly or in part, as a holding reported by another agent under another name. Such duplication results from transfer of ownership during the inquiry and from occasional uncertainty on the part of local informants regarding the owner of record. An estimate on a given tract might be obtained from the corporation or individual who owned it at the time, and some months later, in another State, the estimate might be obtained from a corporation or individual who had bought the tract in the meantime.

As has been said, the field work was begun in the lumber centers, where men may be found who own timber from Florida to Washington. The agents were invariably instructed to report information from every authoritative source, on all timber wherever situated. On the holding of an Oregon corporation, for example, one estimate might be obtained from the manager at the mill, another from the treasurer at Portland, and another from the president in Wisconsin. Sometimes such estimates differed widely. There might be additional estimates from persons holding less responsible positions in the company, or wholly unconnected with it, such as cruisers who had examined the timber for the present owner or for others. In some States, notably Washington, estimates had been made by public officers for purposes of taxation, and these records were carefully considered. All the available estimates for each holding separately reported were transferred in the office from the original reports to a single tabulation sheet, so that they could be readily compared. Then the evidence was carefully weighed, with due regard to the position, means of knowledge, and apparent credibility of each informant. The estimate finally set down was a result of the consideration and balancing of testimony from many sources, often conflicting. In every case, an effort was made to arrive at the best possible judgment; but the care and time devoted to the effort were increased with the importance of the specific case.

Before determining the final estimates placed on these "company sheets" (each company sheet showing the estimates for that particular holding, by counties) preliminary tables had been prepared for each county, giving the number of acres, estimate of timber by species, and average stand per acre, for each separately reported holding in that county. These preliminary "county tables" threw much light on the estimates for particular holdings, for with the help of the county maps the average stands reported by neighboring owners could be compared with a view to detecting abnormal variations. Again, the county tables of particular holdings were a valuable aid as a check on the general estimates for the unenumerated holdings and on the total timber in the county. Over large areas, the average stand given for the holdings of less than 60 million feet was compared, township by township, with the stands reported by the separate holders above that limit.

When the data gathered by the field work had been collated in the office, agents were sent out a second time over practically all the timber area in the five States of the Pacific-Northwest, to verify and correct the results. The agents now had in their hands a digest of all reports previously made, and the conclusions reached in the office, together with a statement of the principal points on which there was uncertainty. The maps on which the separate holdings had been platted showed how the holdings were locally related to each other; which lay side by side and which were intermingled. Sometimes the map and the tables showed that an owner's land was closely associated in location with that of others who had reported two or three times as much timber per acre. When this appeared, the agent sought for the explanation. In some cases he was satisfied that all the estimates were honestly made and reasonably accurate; in others he obtained admissions from the owners themselves, or good evidence from other sources, that some of the estimates first given were far from the truth. This second visit to the Pacific-Northwest was necessary in greater part because of the unwillingness with which many of the most important owners there had met the Bureau's request, some of them giving data which were admitted on the second visit to be incorrect; and in lesser part because of the very marked change in the standards of merchantable timber in that region. This has largely destroyed the value of the estimates made several years ago, and many of the estimates first given to the Bureau were of this kind. The aim was to get sufficient evidence to correct all estimates to an approximate agreement with present-day standards of merchantable timber.

This second period of field work in the five States of the Pacific-Northwest not only overcame these two difficulties, for the most part, but also increased the general accuracy of the work so that the data for that region are believed to be more reliable, according to current standards, than those for either the Southern Pine Region or the Lake States. In the course of the investigation, the Southern Pine Region was taken up first, then the Lake States, then the Pacific-Northwest, and after that the second visit to the last region. The methods used developed toward perfection as the work went on, and the agents became more and more experienced, and this played a very important part in overcoming the greater difficulties in the West.

ATTITUDE OF THREE LARGEST HOLDERS TOWARD BUREAU'S INQUIRY.—The three largest timber holders in the United States, in the order of size, are the Southern Pacific Company (through the Oregon and California Railroad Company and the Central Pacific Railway Company), the Weyerhaeuser Timber Company, and the Northern Pacific Railway Company. The land agent of the Northern Pacific willingly granted access to the records showing the location of the company's land and such records as he had regarding the amount of timber. He stated that the company did not have any reliable information regarding the amount of timber on its land, and this statement is believed to have been made in entire good faith. The officers of the Southern Pacific Company and of its subsidiary companies have claimed to have no information whatever regarding the amount of timber on its land, and to have only unsatisfactory records regarding the acreage and location of the land. It is believed that this company did not at any time meet the requests of the Bureau in good faith—that records and information within the personal knowledge of the officials were withheld. Delay and avoidance characterized the action of the company throughout. It furnished no information whatever regarding the amount of timber on its land. The Weyerhaeuser Timber Company furnished a satisfactory statement of the acreage and location of its land, but for its timber gave mostly old estimates made by the Northern Pacific from the eighties to 1900, before the purchase by the Weyerhaeuser Timber Company, with some more recent ones made by the company after its purchase. The Bureau did not use the estimates furnished. The old estimates were admittedly low even for the time when made, not to speak of the great change in the standards of saw timber since then, and the estimates made by the Weyerhaeuser Timber Company itself were in many cases out of date. No officer of the Weyerhaeuser Timber Company claimed that the estimates furnished were correct. The company simply furnished them as portions of its records. Urged to give access to records that would have thrown light on the error in these old estimates, on the basis of present standards, it gave the dates of such estimates as it furnished, for use in certain comparisons with county cruises, which would bear on the percentages of error in estimates made at different periods; but refused all further information on this subject. It specifically refused other more pertinent records it had, including up-to-date re-estimates on certain of its land, and refused to state the personal judgment of any of its officers or responsible employees as to the amount of its timber. As stated on page 101, the company also refused all information regarding the identity of its stockholders.

Regarding the amount of timber owned by these three companies—the Southern Pacific, the Weyerhaeuser Timber Company, and the

Northern Pacific—the Bureau sought detailed information from all available sources. The agents, with plats of the companies' land, interviewed competent informants wherever they could be found. On the Weyerhaeuser and Northern Pacific lands in the State of Washington all the available county cruises were tabulated, and the results tested and corrected by many office comparisons and field interviews. (In another Part will be given a discussion of the rather large degree of underestimating common in the official county cruises of Washington.)

In these ways reliable information regarding the timber owned by these three companies has been obtained from outside sources, and the figures are presented for each of the companies separately. The Bureau also shows for these companies separately the acreage of the land owned and the location of most of it. This information is not confidential, as it is a matter of public record either in the land-title books of the counties or in the records of the General Land Office.

Except for the three holders just mentioned, this report does not state separately the amount of timber in the large holdings, but presents them by size groups. (See p. 94.)

INCREASE MADE BY BUREAU IN ESTIMATES.—Most obtainable estimates had been made for the use of large buyers, whose first care was for a safe judgment on the value of the property. Such estimates run all the lower because in many instances the buyers have needed only rough and partial estimates to assure them that they were getting at least enough timber to make them safe at the price paid, with the probability that there was considerably more timber on the tract. This, together with the general tendency to underestimate, as stated on page 49, and the errors due to change in merchantable standards, make the available evidence show the amount of timber somewhat under the truth, and for many of the holders severally it is not possible to secure sufficient evidence to raise it to the proper basis. Furthermore, the estimates were not usually meant to give the most probable approximation to the quantity of lumber which would be produced at the mill, but only a conservative approximation to the scale of the logs. Even if the actual scale of the logs were known, the cut of the mill would almost invariably show an overrun. The question of overrun, or the excess of lumber output over log scale, has been studied in the light of the answers to question 8 on the schedule, of general interviews with the best-informed men, and of the actual records of selected sawmills scattered throughout the investigation area. When the figures had been established, on the basis of current methods of estimating standing timber, a correction was made to change them to the basis of the lumber that would actually be sawed under present conditions in the industry. The correction was in the form of a percentage of increase, generally uniform in each State. It was determined after a careful study of all available evidence, and is probably below rather than above the truth, considering both the mill overrun and the normal conservatism of the estimates. The percentages used are, in California, 10 per cent, except redwood, for which 30 per cent was used; in Oregon, 10 per cent; in Washington, 20 per cent, except the Weyerhaeuser Timber Company and five other large holders, for which 15 per cent was used, and a seventh large holder, for which only 10 per cent was used; in Idaho and Montana, the Lake States, and the Southern Pine Region, 25 per cent. These percentages were applied to the totals for each size group, including that of the holders of less than 60 million, known in the tables as group 11; so that the correction affects only the amount of timber, and not the concentration of ownership. The relative size of the ownership groups remains the same, because the same percentage of increase was applied to all timber in each State, except in Washington, where lower rates were applied to seven large companies, because the estimates for them appeared to be on a somewhat higher basis. It is true that in each group of holders there were occasional indications that some were on a higher basis than others, and that for single holders some species were on a higher basis than others. But it did not appear that the general accuracy of the figures could be much better served than by applying the percentages uniformly to the group totals.

Only such timber as could be taken to the saw is included in the figures of this report. Such forest products as firewood, posts, and small poles are made either from trees or parts of trees not suitable for the saw, or as by-products in the manufacture of lumber. Occasionally the timber in a holding, or a part of it, would be estimated in terms of the number of ties or poles in trees which, of that species and in that region, were suitable for the saw, and in such cases these items were converted into board feet of lumber. It would be practically impossible to estimate the amount of such a product as firewood in the United States, although this might be done with reasonable accuracy in certain localities where it has a high price. For the great forest regions of the country, the amount of firewood that could be delivered in the market does not depend on the quantity in existence, but on the cost of getting it from the forest. There it is burned or rots in vast quantities; and all this wasted wood would be used if it could be transported and handled at a cost within the price which consumers could afford to pay for it.

Without question, as the price of lumber advances, a very considerable addition will be made to the supply of timber through the lowering of standards of merchantable timber and the better use of such logs as are now sawed, but there is now no basis upon which this additional amount can be approximated.

Section 10. The investigation area.

The territory covered by the present investigation is called in this report the " investigation area." The necessity of limiting the work to a selected area has already been explained (p. 54). The investigation area embraces three regions, called here "Pacific-Northwest" (California, Oregon, Washington, Idaho, and Montana), " Southern Pine Region" (specifically described below), and "Lake States" (Michigan, Wisconsin, and Minnesota).

The Pacific-Northwest and the Southern Pine Region are the two great sources of soft wood for building and construction. As a practical matter, it was relatively easy to extend the work to the Lake States and very difficult to extend it to the region from Maine to northern Georgia. This was owing to the fact that these last States do not have the rectangular survey, while the Lake States do. In the course of the work it was necessary to locate with exactness the timber covered by each report (see p. 56), and to do this on a large scale is extremely difficult where the rectangular survey does not exist. Moreover, the valuable white pine of Minnesota and the valuable hardwoods in Michigan and Wisconsin give great importance, in proportion to their supply of timber, to the Lake States.

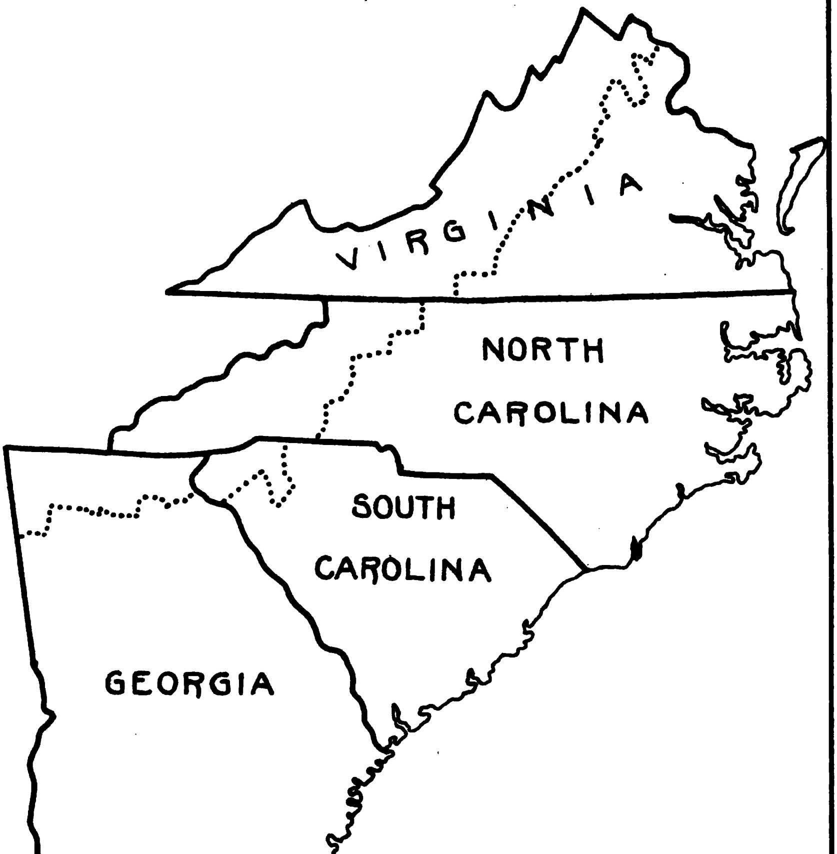
The principal soft-wood timber excluded from the investigation is the spruce, pine, and hemlock in New England, New York, and Pennsylvania; the spruce and hemlock in West Virginia; and the western pine of the southern Rocky Mountain States. An extensive hardwood region throughout the Appalachian system and west thereof to southern Illinois and the Mississippi River is also excluded.

In the Southern States, the intention was to cover primarily the pine area. Some western counties of Virginia, North Carolina, and South Carolina, and some northern counties of Georgia, all outside the pine belt, were omitted. In Texas, the inquiry was practically limited to the pine territory in the eastern part; but the rest of the State contains comparatively little valuable timber. The pine-bearing portion of Missouri is a small part of the State; and the remainder, though it contains considerable amounts of hardwoods, was not covered.

Without exception, the investigation covered all privately owned merchantable saw timber of all species in every county included in the investigation area.

The investigation area contains about four-fifths of the privately owned timber in the United States.

MAP SHOWING THE BOUNDARY OF THE INVESTIGATION AREA IN VIRGINIA, NORTH CAROLINA, SOUTH CAROLINA AND GEORGIA.



NOTE: The investigation area includes all counties East and South of the dotted line.

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Report of the Commissioner of Corporations on the Lumber Industry. Part I.

The Forest Service made a general estimate for all privately owned timber outside the investigation area, as stated on page 65.

Exact area covered.—The investigation area includes all privately owned merchantable saw timber in the following States: California, Oregon, Washington, Idaho, Montana, Arkansas, Louisiana, Mississippi, Alabama, Florida, Michigan, Wisconsin, and Minnesota; and in parts of States as follows:

Missouri.—The following counties: Butler, Cape Girardeau, Carter, Douglas, Dunklin, Mississippi, New Madrid, Oregon, Ozark, Pemiscot, Reynolds, Ripley, Scott, Shannon, Stoddard, Wayne.

Texas.—The following counties: Anderson, Angelina, Bowie, Camp, Cass, Cherokee, Delta, Fannin, Franklin, Gregg, Grimes, Hardin, Harris, Harrison, Henderson, Hopkins, Houston, Hunt, Jasper, Jefferson, Kaufman, Lamar, Leon, Liberty, Marion, Montgomery, Morris, Nacogdoches, Newton, Orange, Panola, Polk, Rains, Red River, Rusk, Sabine, San Augustine, San Jacinto, Shelby, Smith, Titus, Trinity, Tyler, Upshur, Van Zandt, Walker, Waller, Wood.

Georgia.—All counties except the following: Catoosa, Chattooga, Dade, Dawson, Fannin, Floyd, Gilmer, Gordon, Habersham, Lumpkin, Murray, Pickens, Rabun, Towns, Union, Walker, White, Whitfield.

South Carolina.—All counties except the following: Greenville, Oconee, Pickens.

North Carolina.—All counties except the following: Alleghany, Ashe, Buncombe, Burke, Caldwell, Cherokee, Clay, Graham, Haywood, Henderson, Jackson, McDowell, Macon, Madison, Mitchell, Polk, Rutherford, Surry, Swain, Transylvania, Watauga, Wilkes, Yancey.

Virginia.—All counties except the following: Albemarle, Alexandria, Alleghany, Amherst, Augusta, Bath, Bedford, Bland, Botetourt, Buchanan, Carroll, Clarke, Craig, Dickenson, Fauquier, Floyd, Franklin, Frederick, Giles, Grayson, Greene, Highland, Lee, Loudoun, Madison, Montgomery, Nelson, Page, Patrick, Pulaski, Rappahannock, Roanoke, Rockbridge, Rockingham, Russell, Scott, Shenandoah, Smyth, Tazewell, Warren, Washington, Wise, Wythe.

In the stubs of the tables of the report the word "part," in parentheses, follows the name of each State not completely covered, except Texas, where the timber omitted is not of such amount and quality as to make it important.

The division line followed in Georgia, South Carolina, North Carolina, and Virginia was settled upon to include all yellow pine, and also to include all counties not then covered by the Forest Service in certain reconnaissance work in the Appalachian region.

The map opposite this page shows the exact territory covered in Georgia, South Carolina, North Carolina, and Virginia.

SPECIES.—The territories over which some of the most important species are distributed lie entirely within the investigation area, while for other species varying proportions lie outside. Practically the whole area of the following species was covered by the inquiry: Southern yellow pine, cypress, Douglas fir,[1] redwood, and sugar pine. For these species the estimates given in this report are presented as complete. They are the best estimates which the Bureau has been able to make of the whole existing stock of these species in the United States, as well as of the amounts in holdings of specified sizes. Douglas fir and southern yellow pine are now by far the most important items in the timber assets of the country. Far the greater part of the area of western pine, growing in and west of the Rocky Mountain region, was covered. There are, however, important stands of this timber in the Southern Rockies which were not reached. In white pine, spruce, and hemlock, nothing was done in West Virginia, Pennsylvania, New York, and New England, which contribute an important part of the supply. In hardwoods, the large region lying north and west of the southern pine belt was omitted.

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[1] Except for relatively unimportant quantities of Douglas fir in the Rocky Mountain States south of Montana and Idaho.

CHAPTER II.

SUPPLY OF STANDING TIMBER IN THE UNITED STATES.

Section 1. Total timber in continental United States.

The amount of privately owned merchantable saw timber in the investigation area is 1,747 billion (1,747,000,000,000) board feet, distributed by regions as follows: Pacific-Northwest, 1,013 billion; Southern Pine Region, 634 billion; and the Lake States, 100 billion. The investigation area and its subdivisions are defined on pages 62 and 63. Outside this area no investigation was made, but the Forest Service, guided by information obtained through field work along other lines, and by opinions of State foresters in some of the States, has made a general estimate, without division by States or species, of 450 billion feet for all remaining privately owned saw timber. This gives a total of about 2,200 billion feet of privately owned timber in continental United States.

As shown in section 2, the Forest Service has made the following estimates for the timber not privately owned: National forests, 539 billion feet; national parks, military reservations, and unreserved public lands, 26 billion; Indian reservations, 29 billion; and State lands 35 billion; a total of 629 billion feet. These estimates added to the figures in the above paragraph give a total of about 2,800 billion board feet for all merchantable saw timber in continental United States (that is, exclusive of Alaska and the insular possessions), as follows:

TABLE 5.—TOTAL STANDING TIMBER IN CONTINENTAL UNITED STATES.

	Billion feet.
Grand total	2,826
Privately owned timber	2,197
In "investigation area"	1,747
Pacific-Northwest	1,013
Southern Pine Region	634
Lake States	100
Outside of "investigation area"[1]	450
Total owned by Federal Government in national forests[1]	539
Total otherwise owned by Federal Government, owned by States, or on Indian reservations[1]	90

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[1] Estimates furnished by Forest Service.

It should be noted that the estimate made by the Forest Service for the privately owned timber outside the investigation area is a general estimate only, and not the result of a detailed investigation.

It should also be noted that the estimate of 2,800 billion feet for continental United States is based, not on log scale, but on mill output; that is, on the amount of lumber that would be produced from this timber if cut under present standards.

As indicated on page 32, the total quantity of merchantable saw timber now standing in the country is equal to about 55 years' supply at the rate of the present annual consumption.

TOTAL TIMBER IN PACIFIC-NORTHWEST.—Of the total of 2,800 billion board feet in the country, 1,318.2 billion feet is in California, Oregon, and Washington, and 194.7 billion in Montana and Idaho, making a total of 1,512.9 billion, or 54 per cent, in the Pacific-Northwest.

The following table shows the total amount of standing timber in each of the five States of the Pacific-Northwest:

TABLE 6.—TOTAL STANDING TIMBER IN THE PACIFIC-NORTHWEST.

[In billions of board feet. Thus, 1,512.9=1,512,900,000,000 board feet.]

State.	Total.	Privately owned.	National forests.	All other.[1]
Pacific-Northwest	1,512.9	1,013.0	440.8	59.1
California	381.4	248.1	114.4	18.9
Oregon	545.8	398.1	135.8	11.9
Washington	391.0	294.6	81.6	14.8
Idaho	129.1	50.4	71.0	7.7
Montana	65.6	21.8	38.0	5.8

[1] Includes national parks, military reservations, unreserved public land, Indian reservations, and timberland owned by the States. (See p. 67.)

Section 2. Timber publicly owned.

While the Forest Service has estimated the timber in the national forests, this estimate is not the result of a detailed examination of the forest area. It is based on the reports of the experts in charge of the forests, who were directed to make a general examination of the forest area for the purpose in question. Also, the Forest Service has made general estimates from available information regarding the timber in national parks and military reservations and on unreserved public land.

TABLE 7.—STANDING TIMBER OWNED BY THE UNITED STATES GOVERNMENT IN CONTINENTAL UNITED STATES, BY STATES.

[In billions of board feet. Thus, 539.0=539,000,000,000 board feet. Estimates furnished by the Forest Service.]

State.	National forests.	National parks.	Military reservations.[1]	Unreserved public lands.	Total.
Total	539.0	11.8	0.3	13.8	564.9
Arizona	24.7		.1		24.8
Arkansas	2.3			.6	2.9
California	114.4	8.0		3.2	125.6
Colorado	25.1			1.2	26.3
Florida	.1				.1
Idaho	71.0			2.0	73.0
Minnesota	1.6			.5	2.1
Montana	38.0	1.1		1.2	40.3
Nevada	1.6			.1	1.7
New Mexico	16.4			.8	17.2
Oregon	135.8	.5		2.5	138.8
South Dakota	4.9			.4	5.3
Utah	8.4			.3	8.7
Washington	81.6	1.5	.1	.7	83.9
Wyoming	13.0	.7	.1		13.8
Other States	.1			.3	.4

[1] Estimates for military reservations are as follows: Arizona, 50,000,000 feet; Montana, 12,000,000 feet; New Mexico, 40,000,000 feet; Oregon, 600,000 feet; Washington, 75,000,000 feet; Wyoming, 75,900,000 feet; other States, 20,095,000 feet.

The Forest Service has made the following offhand estimates, in billions of board feet, for the timber on land owned by the States and on Indian reservations:

State.	State land.[1]	Indian reservations.	State.	State land.[1]	Indian reservations.
Total	35.5	29.0	Montana	1.2	2.3
Arizona	.7	2.0	New Mexico	.6	.9
California	5.4	2.3	New York	8.6	
Colorado	.7		North Carolina	.2	
Florida	.7		Oklahoma		4.0
Idaho	3.8	1.9	Oregon	5.0	3.9
Michigan	.5		South Dakota	.1	.1
Minnesota	2.5	1.9	Washington	5.0	7.5
Mississippi	.2		Wisconsin		2.0
			Wyoming	.3	.2

[1] Report of the National Conservation Commission, February, 1909 (60th Congress, 2d session, Senate Doc. 676), Vol. II, p. 191.

No reliable information is available regarding the amount of timber on State lands and Indian reservations, and the above estimates are only rough approximations. The Bureau of Corporations has learned incidentally, through its field work on the timber privately owned, that the above estimate for land owned by the State of Oregon is much too high, and that for land owned by the State of Washington much too low.

The 539 billion feet in the national forests—less than one-fifth of the total amount of timber in the country—together with that on State lands, are all that can be considered subject to public management for the purposes of a future supply of timber. The national parks will be managed from a different point of view; the unreserved public lands are subject to private entry under the land laws; and the Indian reservations are held by the Government only for the benefit of the Indians. The timber in the national forests is on the average of considerably less value than that privately owned, because it is of lower quality and less accessible, often lying along high mountain watersheds, or in very rough country where logging is difficult, or in old burns.

It will be noted that 441 billion feet of the timber in the national forests is in the five States of the Pacific-Northwest, and only 9 billion feet of it lies east of the Rocky Mountain States. Most of this 9 billion is in South Dakota, Arkansas, and Minnesota.

Section 3. Privately owned timber in the investigation area, by species.

None of the estimates made by the Forest Service and presented in the two preceding sections included a division by species. The classification by species was carried in all work of the Bureau of Corporations on the privately owned timber in the investigation area.

The only practicable classification of standing timber by kinds, or species, was that according to the usage of the lumber trade. Some of the trade names, such as gum, include trees of different genera and even different botanical families. While there is general uniformity in the use of names in each locality, there is a wide variation the country over, some trees being called by several names and some names being used for several species. There is a tendency to call a comparatively new wood in the market by the name of some similar wood with an established reputation.

For the annual statistics of the lumber cut, the Forest Service and the Bureau of the Census have adopted the list of species shown in Table 18 (p. 88), which is accompanied by an explanatory note regarding some of them. The division between softwoods and hardwoods is made, according to the general custom of the lumber trade, between conifers and deciduous or broad-leaved trees, and has no necessary relation to the actual hardness of the wood. The same list of species is used in this report. Where the same species was reported to the Bureau under different local names, correction was made. Thus, the tree known as tamarack in the Lake States is not found in the Northwest, but the name tamarack is there used by many to designate larch. The name larch is often applied in the same region to both noble fir and lovely fir, true firs of widely different value. Some errors could be corrected on the basis of the habitat of the species, and others only by comparison with the species on neighboring holdings. In the case of the true firs in the Pacific-Northwest, the confusion of names made it impossible to satisfactorily divide the total among the several species.

On a mixed stand of several species, an owner's estimate is likely to be much more accurate for the total than for each species separately. Hardwoods never grow in pure stands of one species, and it is in the attempt to separate hardwoods from each other that the greatest difficulty arises. Such separation is not attempted here, except in Table 12 and in the footnote on page 75.

But this difficulty over mixed stands has no important bearing on the accuracy of the divisions by species presented in this report. In the Southern Pine Region separate estimates are presented only for longleaf pine, shortleaf and loblolly pine, cypress, and for hardwoods collectively, and there is comparatively little intermixture of the forest stands of any two of these four. Likewise, in the Lake States there is little intermixture of the four species divisions. In the Pacific-Northwest small amounts of minor species have no doubt often been included with the main species instead of being separately reported.

When the division by species was not furnished by the holder, it was supplied as well as possible through interviews with other informants and through comparison of the distribution by species on neighboring holdings.

PACIFIC-NORTHWEST.—There is practically no stand of hardwoods in the Pacific-Northwest. An insignificant amount was reported in each State and included in the tables under "All other species."

For a number of localities in California, it was uncertain whether timber reported simply as "fir" was Douglas fir, which is botanically not a fir, or white fir or red fir, both of which are true firs; and in some localities informants would report "red fir" when Douglas fir and not the true red fir was meant. Correction of such errors was made largely on the basis of the botanical distribution of the species.

In Oregon and Washington Douglas fir is commonly reported by cruisers and lumbermen under the names "yellow fir" and "red fir," the terms "yellow" and "red" being used to indicate, apparently, the quality of the timber rather than any difference of species. In general, the term "yellow fir" is applied to the trees of greater age, which are more valuable because of the higher yield of clear lumber. Red fir and yellow fir were formerly the usual terms for this wood in the lumber market. In that use they are now nearly replaced by Douglas fir; but, except when the marketing of lumber is under discussion, the old terms yellow and red are likely to be used still.

There are a number of species of true fir. The most common in the Northwest are white fir, lowland fir, lovely fir, noble fir, silver fir, and alpine fir. Balsam fir is another name for white fir; but almost all the common true firs, except lovely fir and noble fir, go by the name of white fir. Noble fir and lovely fir are sometimes called red fir. A more common term among lumbermen, however, is larch. A considerable amount of larch was reported west of the Cascades, while the range of the true larch is altogether east of the summit of the Cascade Range, except very slight overlaps. The true larch is often called tamarack. In a few unimportant districts, there is some confusion between white pine and western pine, the latter of which is known by several names.

The confusion of names in Oregon and Washington did not result in any material error. It did make it impossible, however, to arrive at correct figures for the different true firs separately, which were, therefore, thrown together in the office tabulations under the term "true firs." In the published tables, true firs are included among "all other species."

There was some confusion of names in the reports from Idaho and Montana, especially between the true firs and Douglas fir. The division between these two in Montana could not always be made with certainty.

Table 8 shows the privately owned standing timber in the Pacific-Northwest, by species.

TABLE 8.—PRIVATELY OWNED STANDING TIMBER IN THE PACIFIC-NORTHWEST, BY SPECIES.

[In billions of board feet. Thus, 1,013.0=1,013,000,000,000 board feet.]

State.	Total timber.	Douglas fir.	White pine.	Western pine.	Sugar pine.	Redwood.	Cedar.	Hemlock.	Spruce.	All other species.
Pacific-Northwest	1,013.0	521.9	19.6	153.4	34.7	101.9	56.7	57.4	21.9	45.5
California	248.1	45.2	....	61.2	23.8	101.9	3.4	....	1.2	11.4
Oregon	398.1	273.5	.2	58.5	10.9	....	12.6	23.9	10.1	8.4
Washington	294.6	193.6	.7	12.5	....	....	37.0	33.0	8.9	8.9
Idaho	50.4	5.1	18.4	13.3	....	....	3.5	.5	.5	9.1
Montana	21.8	4.5	.3	7.9	....	....	.2	....	1.2	7.7
Per cent of the total in each species.										
Pacific-Northwest	100.0	51.5	1.9	15.1	3.4	10.1	5.6	5.7	2.2	4.5
California	100.0	18.2	....	24.6	9.6	41.1	1.4	....	.5	4.6
Oregon	100.0	68.7	.1	14.7	2.7	....	3.2	6.0	2.5	2.1
Washington	100.0	65.7	.2	4.3	....	....	12.6	11.2	3.0	3.0
Idaho	100.0	10.1	36.5	26.4	....	....	6.9	1.0	1.0	18.1
Montana	100.0	20.7	1.4	36.2	....	....	.9	....	5.5	35.3

In the Pacific-Northwest as a whole Douglas fir makes 52 per cent of the total privately owned timber, western pine 15 per cent, and redwood 10 per cent, and the other species are each less than 6 per cent. The relation of each species to the total, for each State, is easily read from the tables.

Considerable interest attaches to the division of the timber in Oregon and Washington between the regions west and east of the summit of the Cascade Range, because of the difference in species, and because of the contrast between the dense compact forest areas on the Pacific slope and the relatively light and scattered stands east of the mountains. In California a very narrow belt of the great redwood stretches south from the Oregon State line for over 200 miles. From this belt to the Nevada line the forests contain Douglas fir, western pine, and sugar pine, and in the east-central part of the State the western pine, sugar pine, bigtree (giant sequoia), and true firs comprise almost all the timber.

In Table 9 California is divided into three parts, as follows: (1) Del Norte, Humboldt, Mendocino, and Sonoma Counties, comprising the northern coast region from the Oregon line nearly to San Francisco; (2) Siskiyou, Modoc, Trinity, Shasta, Lassen, Tehama, Glenn, Butte, and Plumas Counties, comprising that part of northern California east of division 1 from the Oregon line southward to within 50 or 75 miles of Sacramento; (3) the rest of the State. In the first division, the redwood belt enters Sonoma County for only a short distance. The redwood is almost a pure stand, its length north and south being broken here and there by open country or stands of other timbers; and most timber of other species in division 1 lies to the east. In divisions 2 and 3 the great bulk of the timber is east of the Sacramento and San Joaquin Rivers. There is very little privately owned timber south of Tulare County.

All figures in this report for California include 75,000 acres, with about 1 billion feet of timber, owned by the Central Pacific Railway Company in Washoe County, Nev., just across the State line.

In Table 9 Oregon and Washington also are divided, each into two regions—west and east of the Cascade Mountains. The division line follows the summit of the Cascade Range, where it is well marked; but in southern Oregon and across the valley of the Columbia an arbitrary extension is made along county boundaries, Jackson and Hood River Counties, Oreg., and Skamania County, Wash., being included as west of the Cascades. In general, this line separates two very distinct forest regions—Douglas fir to the west, and western pine (mixed with Douglas fir and other species) to the east; but in Washington and northern Oregon the western slope conditions overlap the summit and extend a little way down the eastern slope, while in southern Oregon the eastern slope conditions extend west of the divide into southeastern Douglas, Jackson, and eastern Josephine Counties.

TABLE 9.—PRIVATELY OWNED STANDING TIMBER IN FOREST DIVISIONS OF CALIFORNIA, OREGON, AND WASHINGTON, BY SPECIES.

[In billions of board feet. Thus, 248.1=248,100,000,000 board feet.]

State and division.	Total.	Douglas fir.	White pine.	Western pine.	Sugar pine.	Redwood.	Cedar.	Hemlock.	Spruce.	All other species.
California	248.1	45.2	....	61.2	23.8	101.9	3.4	....	1.2	11.4
Division 1	116.9	16.1	....	3.2	.4	96.1	.1	....	.6	.4
Division 2	90.6	28.8	....	43.8	15.1	....	1.7	....	.4	.8
Division 3	40.6	.3	....	14.2	8.3	5.8	1.6	....	.2	10.2
Oregon	398.1	273.5	0.2	58.5	10.9	....	12.6	23.9	10.1	8.4
West of Cascades	348.5	269.7	.2	17.5	9.3	....	12.2	23.8	10.1	5.7
East of Cascades	49.6	3.8	....	41.0	1.6	....	.4	.1	....	2.7
Washington	294.6	193.6	.7	12.5	....	....	37.0	33.0	8.9	8.9
West of Cascades	270.5	186.1	....	.2	....	....	36.4	32.8	8.6	6.4
East of Cascades	24.1	7.5	.7	12.3	....	....	.6	.2	.3	2.5

Per cent of the total in each species.

State and division.	Total.	Douglas fir.	White pine.	Western pine.	Sugar pine.	Redwood.	Cedar.	Hemlock.	Spruce.	All other species.
California	100.0	18.2	....	24.6	9.6	41.1	1.4	....	0.5	4.6
Division 1	100.0	13.8	....	2.7	.3	82.2	.1	....	.5	.4
Division 2	100.0	31.8	....	48.3	16.7	....	1.9	....	.4	.9
Division 3	100.0	.7	....	35.0	20.5	14.3	3.9	....	.5	25.1
Oregon	100.0	68.7	0.1	14.7	2.7	....	3.2	6.0	2.5	2.1
West of Cascades	100.0	77.4	.1	5.0	2.7	....	3.5	6.8	2.9	1.6
East of Cascades	100.0	7.7	....	82.7	3.2	....	.8	.2	....	5.4
Washington	100.0	65.7	.2	4.3	....	....	12.6	11.2	3.0	3.0
West of Cascades	100.0	68.8	....	.1	....	....	13.4	12.1	3.2	2.4
East of Cascades	100.0	31.1	2.9	51.0	....	....	2.5	.8	1.3	10.4

Of the 1,013 billion board feet of privately owned timber in the Pacific-Northwest, 867 billion is on the "Pacific slope," that is, in California and west of the Cascades in Oregon and Washington; 74 billion east of the Cascades in Oregon and Washington; and 72 billion in Idaho and Montana. (See Table 8.)

The 867 billion feet on the Pacific slope is divided by species as follows: Douglas fir, 501 billion, of which 54 per cent (269.7 billion) is in western Oregon, 37 per cent (186.1 billion) in western Washington, and 9 per cent (45.2 billion) in California; western pine, 79 billion in California and southwestern Oregon; sugar pine, 33 billion in California and southwestern Oregon; redwood, 102 billion in California; cedar, 52 billion, 70 per cent in Washington, 23 per cent in Oregon, and 7 per cent in California; hemlock, 57 billion, 58 per cent in Washington and 42 per cent in Oregon; spruce, 20 billion, 51 per cent in Oregon, 43 per cent in Washington, and 6 per cent in California; and "All other species," mostly true firs, 23 billion, about half in California and the rest about equally divided between Oregon and Washington.

The per cent distribution by species for each forest division is also shown in the above table.

The 146 billion feet in Oregon and Washington east of the Cascades and in Idaho and Montana is divided by species as follows: Western pine, 75 billion, being 55, 16, 18, and 11 per cent in eastern Oregon, eastern Washington, Idaho, and Montana, respectively; white pine, 19 billion, nearly all in Idaho; Douglas fir, 21 billion, being 18, 36, 24, and 22 per cent in eastern Oregon, eastern Washington, Idaho, and Montana, respectively; cedar, 5 billion, three-fourths in Idaho; and the other species, 26 billion, 72 per cent in Idaho and Montana.

About two-thirds of the privately owned timber in Oregon east of the Cascades is in Klamath, the western part of Lake, and the western part of Crook Counties; and about one-third is scattered through the Blue Mountain region from eastern Crook County east and northeast to the State lines. About two-thirds of the timber in Washington east of the Cascades is along the east slope of the Cascades in the counties of Chelan, Kittitas, Yakima, and Klickitat, and about one-third is in Okanogan, Ferry, Stevens, and Spokane Counties. Nearly 90 per cent of the timber in Idaho is in Nez Perce, Latah, Shoshone, Kootenai, and Bonner Counties. Nearly all the timber in Montana is west of the continental divide; Lincoln, Flathead, and Missoula are by far the most important counties. Another Part of this Report will present an extended discussion of large forest areas in northern California and west of the Cascades in Oregon and Washington.

SOUTHERN PINE REGION.—In the Southern Pine Region comparatively little difficulty was experienced by the Bureau in obtaining the estimates for longleaf pine, shortleaf pine, cypress, and total hardwoods separately, but it was impossible to obtain any reliable information regarding the division of hardwoods among the various species. Prior to the field work it was the opinion of many of those familiar with the industry that it would not be practicable to divide the yellow pine between longleaf and shortleaf and loblolly. This opinion probably arose in most part from the fact that there is no complete separation in the lumber market. Although it proved to be impracticable to separate shortleaf and loblolly, the virgin forests of these species are quite distinct from those of longleaf, and this separation could usually be made by careful inquiry. This was especially true in Texas, Louisiana, and Mississippi, and somewhat less so in Alabama. In Georgia, South Carolina, and North Carolina, where most of the original forest has been cut over, and a large part of the present stand is of recent growth and inferior quality, the division of yellow pine into the two classes is much less accurate. A small amount of longleaf was reported in Virginia, but it has been included under shortleaf. There is almost no shortleaf in Florida. Throughout this report shortleaf pine is used to include both shortleaf and loblolly. A great deal of inferior lumber is furnished by the old-field pine, or pine which has grown up on old fields that were cultivated till their fertility was exhausted and were then abandoned, according to the former custom in the South. This is chiefly loblolly. In the lumber market such names as North Carolina pine and Virginia pine are used to designate shortleaf and loblolly from the States of Virginia, North Carolina, South Carolina, and Georgia. The term loblolly is seldom used in the market. Georgia pine generally denotes longleaf or a good grade of shortleaf; not necessarily cut in Georgia.

There is a striking general agreement between the data gathered by the Bureau of Corporations on longleaf and shortleaf and the botanical distribution of the species as shown in Bulletin 13 of the Forest Service.[1] It is believed that the division made is sufficiently accurate for the purposes it may serve, and especially so in Texas, Louisiana, and Mississippi.

In the important cypress regions of Louisiana, Florida, and Georgia there was little difficulty in separating cypress, but in other places along the coast and bordering the Mississippi and other rivers, where there are comparatively unimportant scattered tracts of cypress, it has probably been often included in small amounts under hardwoods.

The hardwoods grow in mixed stands, and never in a pure stand of any large amount of one species. To estimate the total timber in a hardwood tract is, therefore, far easier than to estimate the amount of each species separately. It is only when the hardwoods have become of considerable value that the owners are interested in estimating the different kinds; and a large part of the hardwood in the Southern Pine Region is as yet of very low value. Till late years gum was worthless, and even mixed stands of other hardwoods were often considered only an incumbrance on the agricultural lands of the lower Mississippi. With the great rise in lumber prices, even gum has come to have a market value, but little effort has yet been made to determine the amount of it, and the quantity of the more valuable hardwoods is much less known than that of pine. Because of these conditions, it was impossible to secure as reliable information regarding the total amount of hardwoods as was obtained for yellow pine and cypress, and it was altogether impossible to obtain a satisfactory division of the estimates of total hardwoods among the various species. The questions of the amount of all hardwoods and the approximate distribution by species were put so persistently, however, that nearly every report does give the informant's judgment on the amount of each one separately. Although the division by species is not regarded as sufficiently trustworthy for the publication of the exact amounts reported for each, the facts stated in the footnote below are given for the use of those to whom very general statements may be of help. This approximate division by species should not be used without the addition of statements indicating its probable inaccuracy.[1]

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[1] Also H. Doc. 181, 55th Cong., 3d sess.

It is probable that the lack of interest in hardwoods has resulted not only in defective information about the several species but in too low estimates of the total. The percentage of error in the hardwood estimates as a whole is thought likely to be considerably greater than in the estimates for pine, and the true amount is much more likely to be above the estimates than below.

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[1] Oak, including all species, and gum, are without doubt the predominating hardwoods throughout the Southern Pine Region. The only other species for which it is worth while to give the approximations are hickory and ash. All other hardwoods are included under miscellaneous, and larger or smaller amounts of oak, gum, hickory, and ash have been included under miscellaneous in some of the reports. The approximate percentage distribution of the total hardwoods among oak, gum, hickory, ash, and miscellaneous, as compiled from the opinions of informants, is as follows:

State.	Oak.	Gum.	Hickory.	Ash.	Miscellaneous.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Missouri	42	28	2	4	24
Arkansas	53	23	6	2	16
Texas	33	19	3	4	41
Louisiana	30	25	3	5	37
Mississippi	33	25	4	3	35
Alabama	45	12	7	1	35
Florida	8	12	1	2	77
Georgia	25	11	4	5	55
South Carolina	20	34	2	3	41
North Carolina	28	30	1	1	40
Virginia	39	18	1	1	41
Southern Pine Region	37	22	4	3	34

The standing timber in the Southern Pine Region is shown by species below:

TABLE 10.—PRIVATELY OWNED STANDING TIMBER IN THE SOUTHERN PINE REGION, BY SPECIES.

[In billions of board feet. Thus, 634.0=634,000,000,000 board feet.]

State.	Total.	Yellow pine.			Cypress.	Hard-woods.
		Total.	Long-leaf.	Short-leaf.		
Southern Pine Region	634.0	384.4	232.3	152.1	40.4	209.2
Missouri (part)	9.9	1.1	....	1.1	.9	7.9
Arkansas	78.7	26.0	....	26.0	2.2	50.5
Texas	66.0	44.9	22.4	22.5	.2	20.9
Louisiana	119.8	67.7	52.5	15.2	15.7	36.4
Mississippi	95.3	62.4	47.6	14.8	1.9	31.0
Alabama	56.3	38.0	25.6	12.4	.2	18.1
Florida	73.9	59.1	58.2	.9	10.7	4.1
Georgia (part)	46.0	31.7	18.5	13.2	2.8	11.5
South Carolina (part)	30.7	19.2	4.6	14.6	2.6	8.9
North Carolina (part)	42.9	25.6	2.9	22.7	3.0	14.3
Virginia (part)	14.5	8.7	....	8.7	.2	5.6
Per cent of the total in each species.						
Southern Pine Region	100.0	60.6	36.6	24.0	6.4	33.0
Missouri (part)	100.0	11.1	....	11.1	9.1	79.8
Arkansas	100.0	33.0	....	33.0	2.8	64.2
Texas	100.0	68.0	33.9	34.1	.3	31.7
Louisiana	100.0	56.5	43.8	12.7	13.1	30.4
Mississippi	100.0	65.5	50.0	15.5	2.0	32.5
Alabama	100.0	67.5	45.5	22.0	.4	32.1
Florida	100.0	80.0	78.8	1.2	14.5	5.5
Georgia (part)	100.0	68.9	40.2	28.7	6.1	25.0
South Carolina (part)	100.0	62.5	15.0	47.5	8.5	29.0
North Carolina (part)	100.0	59.7	6.8	52.9	7.0	33.3
Virginia (part)	100.0	60.0	....	60.0	1.4	38.6

Louisiana has 120 billion feet, nearly one-fifth of all the standing timber in the Southern Pine Region. Adjoining it on the west is the timbered part of Texas, on the north the shortleaf pine of southern Arkansas, and to the east the great stand of pine in Mississippi. These four States with Florida have 260 billion of the total of 384 billion feet of yellow pine, 31 billion of the 40 billion feet of cypress, and 143 billion of the 209 billion feet of hardwoods. Louisiana and Florida have the large cypress forests, totaling 26 billion. The virgin pine and cypress forests of these five States have offered the greatest opportunity in the Southern Pine Region for profit through holding timber, and in those forests has come about the greatest concentration of ownership, as is shown in Chapter III.

Speaking generally, from Virginia to Georgia and in some parts of Alabama lumbering has been carried on for a much longer period than in the rest of the region, and consequently the forests have been largely culled, so that much of the yellow pine there is of materially lower value than in the virgin pine forests of Florida, southern Alabama and Mississippi, Louisiana, Texas, and southern Arkansas. This makes the importance of the latter States much greater than is indicated by the above figures.

The hardwoods are far less important than their amount would indicate, as compared with the pine and cypress. Their average value is low because of the high proportion of inferior timber, especially the great quantity of gum. As is shown in Chapter III, the hardwood districts have not passed so largely to the great timber owners.

Lake States.—Comparatively little difficulty was experienced in the Lake States in separating the species as presented in Tables 11 and 12. Here the hardwood stand, unlike most of that in the Southern Pine Region, is of such value that care is usually taken to separate the species in estimates, so that a fairly reliable division among the different species was obtained, as shown in Table 12. The amount shown under "Miscellaneous" includes some woods not specified in the table, and unknown amounts of those separately shown; many of the estimates giving the amounts of the chief hardwoods in the particular tracts, and lumping all others as miscellaneous. Of the white and Norway pine, 79, 83, and 64 per cent was reported as white pine in Michigan, Wisconsin, and Minnesota, respectively, but the accuracy of this division is subject to considerable doubt. There is now little accurate separation of white and Norway pine in the lumber market, and as much of the timber is in mixed stands the terms are often used loosely.

Table 11.—PRIVATELY OWNED STANDING TIMBER IN THE LAKE STATES, BY GROUPS OF SPECIES.

[In billions of board feet. Thus, 100.0 = 100,000,000,000 board feet.]

State.	Total.	White and Norway pine.	Hemlock.	Other conifers.	Hardwoods.
Lake States	100.0	17.7	26.6	13.8	41.9
Michigan	47.6	2.0	15.0	5.2	25.4
Wisconsin	29.2	3.2	11.6	2.3	12.1
Minnesota	23.2	12.5	....	6.3	4.4
Per cent of the total in each group of species.					
Lake States	100.0	17.7	26.6	13.8	41.9
Michigan	100.0	4.2	31.5	10.9	53.4
Wisconsin	100.0	11.0	39.7	7.9	41.4
Minnesota	100.0	53.9	....	27.1	19.0

The 100 billion feet of privately owned timber in the Lake States is distributed as follows: White and Norway pine, 18 billion, 70 per cent of which is in Minnesota; hemlock, 26 billion, in Michigan and Wisconsin; other conifers, chiefly tamarack, spruce, and cedar, 14 billion; maple, 15 billion, mostly in Michigan; birch, 10 billion, basswood, 5 billion, and elm, 4 billion, in Michigan and Wisconsin with small amounts in Minnesota; and 8 billion of other and miscellaneous hardwoods.

TABLE 12.—PRIVATELY OWNED STANDING TIMBER IN THE LAKE STATES, BY SPECIES.

[In billions of board feet. Thus, 100.0=100,000,000,000 board feet.]

Species.	Total.	Michigan.	Wisconsin.	Minnesota.	Species.	Total.	Michigan.	Wisconsin.	Minnesota.
Total	100.0	47.6	29.2	23.2	Hardwoods	41.9	25.4	12.1	4.4
Conifers	58.1	22.2	17.1	18.8	Maple	14.5	12.2	2.3	....
					Birch	10.1	5.1	4.3	.7
					Basswood	5.1	2.2	2.5	.4
White and Norway pine	17.7	2.0	3.2	12.5	Elm	3.7	2.1	1.5	.1
Hemlock	26.6	15.0	11.6	....	Beech	1.6	1.6	....	....
Tamarack	5.4	2.0	1.2	2.2	Ash	1.0	.6	.3	.1
Spruce	3.4	1.2	.2	2.0	Poplar	1.7	....	....	1.7
Cedar	2.5	1.4	.6	.5	Oak	.7	.2	.3	.2
Jack pine	1.4	....	.3	1.1					
Balsam	1.1	.6	....	.5	Balm of Gilead	.3	....	....	.3
					Miscellaneous	3.2	1.4	.9	.9

There is some reason to believe that for Wisconsin the total quantity of pine is understated here. The percentage of error in the estimates of some other species is probably considerable, tending to increase as the reported quantities diminish. It may be, for instance, that the supply of oak is considerably greater than is here indicated.

Section 4. Annual lumber cut compared with the stand of timber.

The broad relation between the annual cut of lumber and the stand of timber, by States and by species, may be shown by comparing the cut as reported by the Bureau of the Census and the Forest Service (see Table 18) with the stand of timber as shown in sections 1 and 3.

TABLE 13.—LUMBER CUT OF THE UNITED STATES, BY SPECIES: 1909.

Species.	Cut (M feet).	Per cent distribution.	Species.	Cut (M feet).	Per cent distribution.
Total	44,509,761	100.0	Hardwoods	10,612,802	23.8
Soft woods	33,896,959	76.2	Oak	4,414,457	9.9
Yellow pine	16,277,185	36.6	Maple	1,106,604	2.5
Douglas fir	4,856,378	10.9	Yellow poplar	858,500	1.9
White pine	3,900,034	8.8	Red gum	706,945	1.6
Hemlock	3,051,399	6.9	Chestnut	663,891	1.5
Spruce	1,748,547	3.9	Beech	511,244	1.1
Western pine	1,499,985	3.4	Birch	452,370	1.0
Cypress	955,635	2.1	Basswood	399,151	.9
Redwood	521,630	1.2	Elm	347,456	.8
Cedar	346,008	.8	Cottonwood	265,600	.6
Larch	264,022	.6	Ash	291,209	.7
Tamarack	157,192	.3	Hickory	333,929	.7
White fir	89,318	.2	Tupelo	96,676	.2
Sugar pine	97,191	.2	Walnut	46,108	.1
Balsam fir	108,702	.2	Sycamore	56,511	.1
Lodgepole pine	23,733	.1	Cherry	24,594	.1
			All other	37,557	.1

Table 13 gives the lumber cut of the United States for 1909, by species. Southern yellow pine furnished 36 per cent of the total; Douglas fir, 11 per cent; oak, 10 per cent; white pine, 9 per cent; and hemlock, 7 per cent. These five species together furnished 73 per cent, or nearly three-fourths, of the whole.

Table 14 compares the amount of lumber cut during 1909 with the total stand of timber, both privately and publicly owned (see secs. 1 and 2), for each State entirely within the investigation area. Missouri, Georgia, South Carolina, North Carolina, and Virginia are included in "All other States," as part of each is outside the investigation area, and there is no estimate for the total stand in any one of them.

TABLE 14.—TOTAL STAND OF TIMBER, PRIVATELY AND PUBLICLY OWNED, AND LUMBER CUT (1909) BY STATES.

State.	Stand of timber.		Lumber cut, 1909.		Percentage of total stand cut in 1909.
	Billions of feet.	Per cent distribution.	Thousands of feet.	Per cent distribution.	
United States	2,826.4	100.0	44,509,761	100.0	1.6
Pacific-Northwest	1,512.9	53.5	7,859,800	17.7	.5
California	381.4	13.5	1,143,507	2.6	.3
Oregon	545.8	19.3	1,898,995	4.3	.3
Washington	391.0	13.8	3,862,916	8.7	1.0
Idaho	129.1	4.6	645,800	1.4	.5
Montana	65.6	2.3	308,582	.7	.5

TABLE 14.—TOTAL STAND OF TIMBER, PRIVATELY AND PUBLICLY OWNED, AND LUMBER CUT (1909) BY STATES—Continued.

State.	Stand of timber.		Lumber cut, 1909.		Percentage of total stand cut in 1909.
	Billions of feet.	Per cent distribution.	Thousands of feet.	Per cent distribution.	
Lake States	109.0	3.9	5,476,270	12.3	5.0
Michigan	48.1	1.7	1,889,724	4.2	3.9
Wisconsin	31.2	1.1	2,025,038	4.6	6.5
Minnesota	29.7	1.1	1,561,508	3.5	5.8
Six Southern States	493.9	17.5	13,227,752	29.7	2.7
Arkansas	81.6	2.9	2,111,300	4.7	2.6
Texas	66.0	2.3	2,099,130	4.7	3.2
Louisiana	119.8	4.2	3,551,918	8.0	3.0
Mississippi	95.5	3.4	2,572,669	5.8	2.7
Alabama	56.3	2.0	1,691,001	3.8	3.0
Florida	74.7	2.7	1,201,734	2.7	1.6
All other States	[1] 710.6	25.1	17,945,939	40.3	2.5

[1] Includes 144 billion privately owned within the investigation area in Missouri, Georgia, South Carolina, North Carolina, and Virginia; the 450 billion estimated by the Forest Service for all privately owned timber outside the investigation area (see p. 65); and 116.6 billion nonprivate timber in States lying outside the investigation area. (See secs. 1 and 2.)

The last column of Table 14 shows what fraction of the total stand in each State was cut in 1909. Thus, California contains 381.4 billion feet of standing timber, publicly and privately owned. During the year 1909 only 1,143,507 thousand feet, or but three-tenths of 1 per cent of it, was sawed into lumber. In the Lake States the cut was 5 per cent of the stand, and in the six Southern States it ranged from 2.6 to 3.2 per cent, except in Florida, where it was 1.6 per cent, the same as in the country as a whole.

The Pacific-Northwest has more than half the timber supply of the country and furnishes only a little more than one-sixth of the annual cut; in other words, just about one-third as much lumber is now being sawed there as would be sawed were the annual cut distributed among the States in proportion to the stand of timber. In the Lake States the cut is three times as great as it would be under such a distribution. In the six Southern States and in the "other States" the relation is one and seven-tenths and one and six-tenths, respectively.

The comparison of cut and stand is best made on the basis of the privately owned timber, by species, as is done in Tables 15, 16, and 17. The publicly owned timber is not an important part of the stand except in the Pacific-Northwest. The cut includes what comes from the national forests, but the amount of this is not enough to materially affect the comparison except in one or two States. For other reasons, however, the percentages here given can be taken only broadly. The division by species is not wholly trustworthy, either for the stand or for the cut. The error is probably greatest for the minor species. There is a tendency to sell a comparatively unknown or inferior wood under the trade name of some kind well established in the market, and no doubt this has influenced the returns to the Bureau of the Census. The stands shown by the present report are less accurate for the minor than for the important species in each locality (see p. 69); the timber owners would in many cases either include the small amounts of the less important species under the more important or report them as miscellaneous.

In a few cases appreciable amounts of timber grown in one State are manufactured into lumber in another. Thus, many North Carolina logs are sawed at Norfolk and Suffolk, Va., and it is understood that some Minnesota pine is sawed in Wisconsin. In such cases the cut is credited to the State where the mill stands; for the Census reports of cut are mill reports, and do not relate to the origin of the logs.

For all these reasons the cut of the several species as shown by the Bureau of the Census can not be taken as exactly comparable with the stand as reported by the Bureau of Corporations. Wherever there is a considerable amount of a species in a State, however, the relation between stand and cut as thus shown is broadly correct.

The following table shows the percentages obtained by dividing the total cut of 1909 by the privately owned stand, in the Pacific-Northwest and each State thereof, by species:

TABLE 15.—APPROXIMATE PERCENTAGE OF THE PRIVATELY OWNED STANDING TIMBER OF EACH SPECIES CUT[1] DURING 1909, FOR THE PACIFIC-NORTHWEST AND FOR EACH STATE.

State.	All species.	Douglas fir.	White pine.	Western pine.	Sugar pine.	Redwood.	Cedar.	Hemlock.	Spruce.	All other.
Pacific-Northwest	0.8	0.9	1.0	0.8	0.3	0.5	0.4	0.2	1.1	0.8
California	.5	.2	....	.6	.4	.5	.4	......	1.1	.5
Oregon	.5	.6	....	.3	.1	......	.2	.1	.6	.4
Washington	1.3	1.6	(2)	2.1	......	......	.5	.3	1.9	.6
Idaho	1.3	1.3	.9	1.9	......	......	.8	.2	.2	1.4
Montana	1.4	1.0	.6	1.9	......	......	(3)	......	.6	1.4

[1] The figures of cut include the small quantity cut from national forests. For this and other sources of possible error, see the paragraphs immediately preceding this table.

[2] Per cent omitted. Stand of this species is small, and part of it may have been reported under other names; also the reported cut of it may in fact have been partly other species.

[3] Less than one-tenth of 1 per cent.

The highest percentages in the above table are for western pine and Douglas fir in Montana, Idaho, and Washington, spruce in Washington and California, and miscellaneous woods in Montana and Idaho, ranging from 1 per cent for Douglas fir in Montana to 2.1 per cent for western pine in Washington.

Table 16 presents similar data for the States in the Southern Pine Region.

TABLE 16.—APPROXIMATE PERCENTAGE OF THE STAND OF PRIVATELY OWNED YELLOW PINE, CYPRESS, AND HARDWOODS CUT DURING 1909, FOR THE SOUTHERN PINE REGION AND FOR EACH STATE.

State.	All species.	Yellow pine.	Cypress.	Hardwoods.
Southern Pine Region	(1)	4.1	2.3	(1)
Missouri (part)	(1)	12.9	3.7	(1)
Arkansas	2.7	5.1	2.5	1.5
Texas	3.2	4.5	1.0	.4
Louisiana	3.0	4.0	3.9	.6
Mississippi	2.7	3.4	2.2	1.3
Alabama	3.0	4.0	3.3	1.0
Florida	1.6	1.9	.8	.1
Georgia (part)	(1)	3.8	1.0	(1)
South Carolina (part)	(1)	4.2	1.4	(1)
North Carolina (part)	(1)	6.2	1.2	(1)
Virginia (part)	(1)	14.0	2.7	(1)

[1] The yellow pine and cypress territory is practically all within the investigation area, and the cut of those species may therefore be compared with the stand shown in Table 10; but as explained on page 62 only a part of the hardwood territory of Missouri, Georgia, South Carolina, North Carolina, and Virginia is within the investigation area, and it is thus impossible to compare stand and cut of hardwoods and "all species" in those States.

The most striking fact shown by Table 16 is the great difference in the relation of annual cut to stand between yellow pine and cypress on the one hand and hardwoods on the other. Large amounts of hardwoods in these States have not yet reached a price which would lead to extensive marketing. For instance, the cut of yellow pine in Texas during 1909 was 4.5 per cent of the stand, while the cut of hardwood was only 0.4 per cent. In other words, the present annual drain is proportionally 11 times as great upon the yellow-pine supply of Texas as upon the supply of hardwoods. As is shown in Table 10, Louisiana and Florida contain the large amounts of cypress, and Table 16 shows that the present rate of cut from the cypress forests is 5 times as great in Louisiana as in Florida.

The area covered by this table includes practically the entire supply of southern yellow pine and cypress. In southern yellow pine the annual cut is equal to 4.1 per cent of the stand, and in cypress the cut is 2.3 per cent. In the six States lying entirely within the investigation area the cut of hardwoods during 1909 was 1 per cent of the total stand, and the cut of " all species " was 2.7 per cent of the stand.

Table 17 shows similar data for the Lake States.

TABLE 17.—APPROXIMATE PERCENTAGE OF THE PRIVATELY OWNED WHITE AND NORWAY PINE, HEMLOCK, OTHER CONIFERS, AND HARDWOODS CUT DURING 1909, FOR THE LAKE STATES.

State.	All species.	White and Norway pine.	Hemlock.	Other conifers.	Hardwoods.
Lake States	5.5	12.3	5.0	2.4	3.9
Michigan	4.0	12.9	4.1	1.8	3.6
Wisconsin	6.9	19.1	6.1	3.4	5.2
Minnesota	6.7	10.5	....	2.5	1.9

In the Lake States the prices of almost all standing timber have now become so high that extraordinary profits are not expected from speculative holding, and the owners are disposed to realize. The table indicates that a substantial fraction of the timber of almost every species was cut in 1909. The high percentage of white pine is explained partly by its high value and partly by the approaching exhaustion of the virgin stand. The cut diminishes year by year. More sawing equipment has been provided than would have been provided if the supply had not formerly been much greater than now, and each mill, having been employed on white pine, tends to continue in the same line as long as possible. This influence is less important in Minnesota than in Wisconsin or Michigan, and accordingly the cut appears as 10.5 per cent of the stand in Minnesota, against 13 per cent in Michigan and 19 per cent in Wisconsin. The reported stand of white and Norway pine in Wisconsin (3.2 billion feet) is perhaps too low, giving an unduly high percentage in the above table.

The faster the value of standing timber is expected to increase the slower its owners are to cut it. As in all calculations of profit, the increase that counts is a proportional increase. An advance from 50 cents a thousand feet to $1 gives the same rate of return on investment as an advance from $5 a thousand to $10; in either case the investor doubles his money. But the smaller increase may be expected to come faster, because it does not involve so great a relative increase of the price of lumber.

When the owner cuts his timber, he gets for it what is left of the price he gets for his lumber when the cost of converting the trees into lumber (plus his manufacturing profit and freight) is deducted. If the conversion cost and the manufacturing profit amount to $10 a thousand feet and the average freight to the points of consumption is $10 more, the lumber must bring an average price of $20.50 at the point of consumption to give the owner 50 cents for his standing timber. From $20.50 to $21 would be a trifling change of price, but it would double the proceeds of his stumpage, raising them from 50 cents to $1. Now, let the average price of lumber be $25 while the cost of conversion, with profit, and the average freight, are still $10 each. The return for the stumpage is $5. To double this, the average price of lumber must be raised from $25 to $30. This is apt to take much longer than the rise from $20.50 to $21, which gave stumpage owners the same percentage of profit from holding.

To state the case more generally, the thing that interests the stumpage owner is the margin between the cost of converting trees into lumber and the price of the product. The conversion cost is comparatively constant; changes of lumber price, as far as they are believed to be permanent, are mostly reflected in the margin which represents the proceeds of the stumpage. As the margin increases, any given rise of lumber prices, increasing the return from the stumpage by the same absolute amount as before, increases it by a smaller percentage.

An increase is likeliest, for a given kind of timber, while the value is low. Other things being equal, therefore, the lower the price of timber the more profitable it will be to hold. As the price goes up the chance of a satisfactory rate of future profit becomes less, and owners are disposed to realize and look for investments elsewhere. Present stumpage values may be taken as ranging up to $5 a thousand in the Pacific-Northwest and up to $15 in the Lake States. This is the proximate reason why the lumber cut of the Lake States in 1909 was one-eighteenth, while that of the Pacific-Northwest was only one one-hundred-and-twenty-fifth, of the privately owned timber; why Oregon, with four times as much privately owned timber as the three Lake States, cut little more than one-third as much as they. In the Lake States, the annual percentage of rise in value promises to be so small that the timber is being rapidly turned into money. In the Pacific-Northwest the rise promises in most cases to equal a high rate of interest, and most owners prefer to hold.

Differences of stumpage value depend on many circumstances, but one of overwhelming importance is accessibility to market. This reduces itself practically to a matter of freight rates. Lumber is very heavy in proportion to its value, and differences of freight rate are of enormous importance.

The freight rate from Portland, Oreg., or Seattle, to Chicago is 55 cents a hundred pounds. From the southwestern yellow-pine territory it is only 26 cents. Douglas fir weighs from about 2,000 pounds a thousand feet in flooring to about 3,300 pounds in rough green timbers; shortleaf pine from about 2,000 pounds in flooring to 4,200 pounds in timbers; longleaf pine from about 2,200 pounds in flooring to about 4,500 pounds in timbers. The advantage of the southwestern pine territory in freight to Chicago ranges from $5.25 to $7.25 per thousand feet. As a result, only a relatively small amount of

Douglas fir is shipped as far east as Chicago, except timbers of such length and thickness as can be sawed only from the great trees of the Pacific slope. The freight rates to Omaha from Seattle or Portland and from Texarkana or Beaumont are 50 cents and 25 cents, respectively. Here the advantage of the southwestern pine is from $4.50 to $6. Passing westward from the neighborhood of Omaha, the advantage of the southern region diminishes, and an increasing quantity of lumber from the Pacific-Northwest is found.

Of any species, some grades and some special dimensions and dressed forms are shipped farther than others. Many prefer rift yellow-pine flooring to that of Douglas fir. On the other hand, Douglas fir takes paint better than yellow pine, and its grain is often preferred for interior finish where the grain is to be shown. So it comes about that in some places where one wood furnishes the greater part of the flooring, another may furnish a large part of the siding, finish, and ceiling. Again, some woods are desirable for interiors, but decay badly if exposed to the weather.

In general, too, the lowest grades are used near home, and the best grades travel farthest. This is because the freight is the same for the poor lumber as for the good, and so is far higher on the poor in proportion to its value.[1] Very inferior stuff at $12 may be pre-

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[1] The article below, in showing the effect of freight rates on the competition between different regions and between different grades, points out how the freight may even be more per thousand on the cheaper than on the higher-priced lumber. The article was written by Mr. A. F. Peterson, assistant manager of the National Lumber & Box Co., Hoquiam, Wash., and published in The Timberman, Portland, Oreg., January, 1910, p. 32W. The abbreviations "V. G." and "F. G.," descriptive of flooring, mean vertical grain and flat grain. The freights on yellow pine appear to be reckoned on the Kansas City rate, 24 cents, when not otherwise specified. The Omaha rate of 26½ cents, given in the table below, was changed to 25 cents on Oct. 12, 1910. The far lower estimated weight of flooring than of rough lumber is due partly to the removal of the shavings (dressed lumber. such as flooring, being counted according to its dimensions before dressing), and partly, it would seem, to the tacit assumption that the rough lumber is shipped green.

"Relatively, fir and yellow pine conditions for January, 1910, comparing fir values on a Missouri River rate of 50 cents with yellow-pine values on southern rates of 24 and 26½ cents, are as follows:

	Fir, 50 cents.	Yellow pine.	
		24 cents.	26½ cents.
Dimension (sized):			
2 by 4—16	$22.00-$23.50	$19.50	$20.25
2 by 4—18-20	24.00- 25.50	22.50	23.25
2 by 4—22-24	25.00- 26.50	24.50	25.50
2 by 12—16	23.50- 25.00	20.75	21.50
2 by 12—18 and 20	24.50- 26.00	22.25	23.00
2 by 12—22-24	25.50- 27.00	24.50	25.50
Small timbers (rough):			
6 by 6 and 6 by 8—16 feet	25.50- 27.00	22.25	24.00
6 by 6 and 6 by 8—32 feet	29.50- 31.00	27.75	29.00
Common boards:			
1 by 10—16	22.00- 24.00	20.25	21.00
1 by 12—16	22.50- 24.50	23.25	24.00
Flooring, V. G., 1 by 4, No. 2	35.00- 37.00	A 36.00 B 33.50	36.50 34.00
Flooring, F. G., 1 by 4, No. 2 and better	26.00- 29.00	A 25.00 B 24.00	25.50 24.50

ferred to somewhat better lumber at $13, though the choice might be the other way if the prices were $22 and $23. This makes it possible to sell at a profit, where the freight charge is very little, lumber so poor that it could hardly be sold for the amount of the freight where that is high. Similarly, where lumber from different regions meets and competes, a difference of $1 a thousand may determine the control of the market for common boards, say, at about $20 a thousand, while on lumber worth $40 a difference of $1 would hardly

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" The above comparisons are made on Omaha (Nebr.) and Kansas City basis.

" Relative fir and yellow-pine mill basis values, using the above figures, are as follows:

	Fir, mill basis.	Yellow pine, mill basis.
Dimension (sized):		
2 by 4—16	$9.00–$10.50	$13.50
2 by 4—18 and 20	11.00– 12.50	16.50
2 by 4—22-24	12.00– 13.50	18.50
2 by 12—16	10.00– 11.50	14.75
2 by 12—18 and 20	11.00– 12.50	16.25
2 by 12—22 and 24	12.00– 13.50	18.50
Small timbers (rough):		
6 by 6 and 6 by 8—16 feet	9.00– 10.50	12.25
6 by 6 and 6 by 8—32 feet	13.00– 14.50	17.25
Common boards:		
1 by 10—16	9.50– 11.50	14.25
1 by 12—16	10.00– 12.00	17.25
Flooring, V. G., 1 by 4, No. 2	25.00– 27.00	A 31.25 B 28.75
Flooring, F. G., 1 by 4, No. 2 and better	16.00– 19.00	A 20.25 B 19.25

" Yellow pine, even at the lower selling basis in competitive territory, it is noted, commands a higher relative mill base than fir. This, of course, is explained by the difference in freight rate from the South as against freight rate from the Coast, which, per thousand feet, is as follows:

	Fir.	Yellow pine.
Dimension	$13.00	$6.00
Timbers	16.50	10.00
Common boards and fencing	12.50	6.00
Flooring	10.00	4.75

" The differences are particularly noticeable in dimension, timbers, and common boards and fencing, and give yellow pine absolute control of the selling basis of these stocks throughout the great Middle West.

" The marketing of low-grade fir into the Middle West will always be handicapped as long as the present method of calculating transcontinental freight rates on a flat rate per hundred pounds for all classes of fir products remains in force.

" An ordinary 40-foot car of 80,000 pounds capacity loaded with 30,000 feet of No. 1 flooring and valued at $1,200 f. o. b., a 50-cent rate, will require an outlay of approximately $270 (54,000 pounds, at 50 cents) for freight. The same car, loaded with, say, 25,000 feet of common rough fir and valued at approximately $637 to $650 f. o. b., a 50-cent rate, will require an outlay of $412.50 (82,500 pounds, at 50 cents), or practically a 53 per cent greater cost per car for freighting of the rough common fir than the cost of freighting the car of flooring representing an 84 per cent higher destination valuation than the car of rough common.

" To overcome this condition, graduated rates of coast fir products, based to some extent on the character and not the weight of the commodity, is required.

" It will not require much of a change in freight rates to place low-grade fir on a parity with yellow pine. The bulk of our Eastern movement to-day is in high-grade stocks. What we want are freight rates that will permit of the movement of our common lumber instead of simply a small percentage of our output in the better grade."

be regarded, and the choice at such a difference would be determined almost wholly by other considerations.

Lumber cut, 1909, in detail, by States.—The statistics of lumber production are so important in connection with the supply of standing timber that they are given in full in Table 18, by States and species, with the numbers of lath and of shingles made in each State. Lath are chiefly a by-product of sawmills. Shingles are often made at sawmills, but the greater part come from separate plants. The shingle-mill business is especially developed in the State of Washington, where the chief material used is cedar and where more than half the shingles of the country are made. The first column in Table 18 includes all mills reporting lumber, lath, or shingles, and the numbers therefore differ from the numbers of sawmills shown on pages 34 and 278. Thus the sawmills reported in the United States in 1909 were 46,584, while the mills reporting lumber, lath, or shingles were 48,112.

White pine in this table includes the timber originally called by that name growing in the Lake States, the Middle States, New England, and the southern Appalachian region; Norway pine and a certain proportion of jack pine, tamarack, and other species sold with white pine in the Lake States under the name of northern pine; and the white pine of Montana, Idaho, and Washington, which is very similar to the white pine of the East.

Yellow pine includes all pine lumber produced east of the Rocky Mountains except white, Norway, and jack pine. The term covers several botanical species, such as longleaf pine, shortleaf pine, loblolly pine, and Cuban pine. Most of the yellow pine cut in Virginia, North Carolina, and South Carolina is loblolly, or, as the bulk of it is known commercially, North Carolina pine or Virginia pine. The principal species cut in Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas is longleaf, while practically all the yellow pine cut in Arkansas and Missouri is shortleaf.

By the term "western pine" is here meant the western yellow pine, known botanically as *Pinus ponderosa*, although small quantities of lumber cut from other western pines are probably included. It is properly classed with the pitch or yellow pines, but the wood is lighter and less resinous than that of the southern yellow pines, and many manufacturers insist, with considerable reason, that it is so nearly like white pine that the word "white" should appear in the name.

Sugar pine belongs to the white-pine family.

The terms "larch" and "tamarack" are used interchangeably both in the Lake States and in Montana, Idaho, eastern Washington, and eastern Oregon, but the species so designated in the two regions are wholly different. Tamarack in this table designates the Lake States species and larch the western.

TABLE 18.—CUT OF LUMBER BY SPECIES AND CUT OF LATH AND SHINGLES, FOR EACH STATE: 1909.

[From "Forest Products of the United States: 1909," compiled by Bureau of the Census in cooperation with Forest Service.]

State.	Active mills reporting.[1]	Total cut of lumber.	Softwoods.				
			Total softwoods.	Yellow pine.	Douglas fir.	White pine.	Hemlock.
		M feet.	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M feet.*
United States..........	48,112	44,509,761	33,896,959	16,277,185	4,856,378	3,900,034	3,051,399
Alabama....................	2,188	1,691,001	1,516,382	1,506,863	....	....	....
Arizona....................	21	62,731	62,731	....	5,527	....	....
Arkansas....................	2,060	2,111,300	1,369,187	1,313,668	....	....	....
California....................	305	1,143,507	1,141,301	....	88,852	....	416
Colorado....................	250	141,710	141,549	....	6,046	....	....
Connecticut....................	420	168,371	44,249	2,152	....	30,579	11,177
Delaware....................	151	55,440	40,990	38,320	....	960	....
Florida....................	491	1,201,734	1,196,912	1,110,840	....	....	....
Georgia....................	2,083	1,342,249	1,259,231	1,194,987	....	31,324	966
Idaho....................	304	645,800	640,354	....	63,869	169,403	1,165
Illinois....................	827	170,181	4,521	....	....	153	....
Indiana....................	1,604	556,418	1,216	....	....	64	432
Iowa....................	350	132,021	80,378	....	....	80,158	215
Kansas....................	7	4,716	....	....	....	....	....
Kentucky....................	2,372	860,712	78,889	38,419	....	4,606	27,036
Louisiana....................	658	3,551,918	3,345,610	2,736,756	....	....	....
Maine....................	1,243	1,111,565	993,954	13,474	....	383,551	109,581
Maryland....................	729	267,939	130,884	97,598	....	4,943	20,912
Massachusetts....................	643	361,200	291,429	6,110	....	222,604	24,797
Michigan....................	1,323	1,889,724	966,747	....	....	258,080	614.622
Minnesota....................	745	1,561,508	1,479,553	....	....	1,308,861	15,552
Mississippi....................	1,795	2,572,669	2,156,427	2,114,706	....	....	....
Missouri....................	2,076	660,159	178,146	142,271	....	....	....
Montana....................	180	308,582	308,072	....	43,270	1,671	....
New Hampshire....................	708	649,606	592,663	17,526	....	242,656	66,898
New Jersey....................	276	61,620	24,690	16,145	....	323	212
New Mexico....................	80	91,987	91,987	....	4,925	....	....
New York....................	2,308	681,440	404,554	....	....	104,658	162,784
North Carolina....................	3,307	2,177,715	1,776,401	1,575,186	....	96,624	40,018
Ohio....................	1,632	542,904	10,389	1,629	....	203	8,415
Oklahoma....................	380	225,730	141,677	141,664	....	....	....
Oregon....................	696	1,898,995	1,895,950	....	1,581,621	....	24,794
Pennsylvania....................	3,054	1,462,771	820,604	32,623	....	92,431	687,005
Rhode Island....................	57	25,489	13,660	1,106	....	11,403	770
South Carolina....................	1,048	897,660	855,515	797,094	....	7,618	888
South Dakota....................	54	31,057	30,234	....	....	....	....
Tennessee....................	2,643	1,223,849	208,126	117,135	....	35,553	35,593
Texas....................	719	2,099,130	2,021,617	2,019,423	....	....	....
Utah....................	88	12,638	12,211	....	674	....	....
Vermont....................	725	351,571	242,930	3,184	....	43,274	62,345
Virginia....................	3,511	2,101,716	1,460,133	1,221,691	....	96,061	42,359
Washington....................	1,143	3,862,916	3,861,137	....	3,060,983	33,960	103,268
West Virginia....................	1,524	1,472,942	565,395	16,615	....	25,986	279,832
Wisconsin....................	1,241	2,025,038	1,399,398	....	....	612,327	709,347
Wyoming....................	89	28,602	28,476	....	611	....	....
All other States[2]............	4	11,230	10,500	....	....	....	....

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[1] The numbers in this column include all mills reporting lumber, lath, or shingles, and therefore are greater than the numbers of sawmills shown on p. 34 and in Table I, p. 278.

[2] Includes Nebraska and Nevada.

TABLE 18.—CUT OF LUMBER BY SPECIES AND CUT OF LATH AND SHINGLES, FOR EACH STATE: 1909—Continued.

State.	Softwoods—Continued.							
	Spruce.	Western pine.	Cypress.	Redwood.	Cedar.	Larch.	Tamarack.	White fir.
	M feet.	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M feet.*
United States	1,748,547	1,499,985	955,635	521,630	346,008	264,022	157,192	89,318
Alabama			6,650		2,869			
Arizona	4	57,089						111
Arkansas			55,012		507			
California	13,241	364,748		521,630	14,834			48,306
Colorado	32,471	95,254						585
Connecticut	262				78			
Delaware	1,610		32		68			
Florida			84,811		1,261			
Georgia	2,789		27,517		1,648			
Idaho	1,136	254,283			28,644	97,743		22,795
Illinois			4,186		30		152	
Indiana			125		595			
Iowa					3		2	
Kansas								
Kentucky	2,226		5,607		995			
Louisiana			608,854					
Maine	421,297				15,140		420	
Maryland	5,718		1,601		112			
Massachusetts	36,911				618		102	
Michigan	21,797				17,647		44,956	
Minnesota	78,500				1,945		63,555	
Mississippi			41,666		55			
Missouri			32,891		2,984			
Montana	6,837	146,890			60	104,130		2,647
New Hampshire	253,107				44		201	
New Jersey	125				7,885			
New Mexico	3,822	82,739						501
New York	127,864							
North Carolina	24,277		34,506		5,665			
Ohio	78				16		48	
Oklahoma			13					
Oregon	57,002	169,592			26,607	22,354		5,586
Pennsylvania	7,307				374		809	
Rhode Island	355				26			
South Carolina	13,803		36,040		72			
South Dakota		30,234						
Tennessee	720		8,709		8,927			
Texas			1,972		222			
Utah	2,381	7,495			20			796
Vermont	123,164				876		28	
Virginia	79,672		5,443		14,907			
Washington	165,331	266,357			183,952	39,795		7,491
West Virginia	242,897				65			
Wisconsin	21,168				6,257		46,919	
Wyoming	675	15,304						
All other States[1]		10,000						500

[1] Includes Nebraska and Nevada.

TABLE 18.—CUT OF LUMBER BY SPECIES AND CUT OF LATH AND SHINGLES, FOR EACH STATE: 1909—Continued.

State.	Softwoods—Continued.			Hardwoods.				
	Sugar pine.	Balsam fir.	Lodgepole pine.	Total hardwoods.	Oak.	Maple.	Yellow poplar.	Red gum.
	M feet.	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M feet.*
United States	97,191	108,702	23,733	10,612,802	4,414,457	1,106,604	858,500	706,945
Alabama	....	....	....	174,619	86,557	1,041	38,324	17,092
Arizona	....	....	....	....	....	....	....	....
Arkansas	....	....	....	742,113	358,556	18,500	4,484	200,953
California	88,822	....	452	2,206	2,180	....	....	....
Colorado	....	463	6,730	161	....	....	....	....
Connecticut	....	1	....	124,122	34,246	3,924	....	....
Delaware	....	....	....	14,450	11,128	331	313	1,659
Florida	....	....	....	4,822	1,300	....	1,268	260
Georgia	....	....	....	83,018	46,329	535	21,472	4,828
Idaho	....	88	1,228	5,446	....	....	....	....
Illinois	....	....	....	165,660	101,279	7,163	3,628	9,748
Indiana	....	....	....	555,202	228,343	43,644	29,174	23,649
Iowa	....	....	....	51,643	17,335	3,128	....	....
Kansas	....	....	....	4,716	524	117	....	....
Kentucky	....	....	....	781,823	405,677	9,069	149,808	42,072
Louisiana	....	....	....	206,308	74,490	445	886	34,499
Maine	....	50,491	....	117,611	18,554	16,714	....	....
Maryland	....	....	....	137,055	71,792	6,391	5,328	4,482
Massachusetts	....	287	....	69,771	13,991	6,166	....	....
Michigan	....	9,645	....	922,977	40,023	543,214	....	....
Minnesota	....	11,140	....	81,955	15,801	1,519	....	....
Mississippi	....	....	....	416,242	168,508	770	25,833	120,731
Missouri	....	....	....	482,013	271,623	10,376	1,791	83,905
Montana	....	....	2,567	510	....	....	....	....
New Hampshire	....	12,231	....	56,943	15,919	7,892	....	....
New Jersey	....	....	....	36,930	17,700	476	957	429
New Mexico	....	....	....	....	....	....	....	....
New York	....	9,248	....	276,886	36,520	75,024	2,351	....
North Carolina	....	125	....	401,314	209,405	5,510	74,285	30,883
Ohio	....	....	....	532,515	259,410	43,852	42,317	2,194
Oklahoma	....	....	....	84,053	60,964	342	....	2,557
Oregon	8,369	....	25	3,045	165	1,491	....	....
Pennsylvania	....	55	....	642,167	297,154	91,654	14,727	1,178
Rhode Island	....	....	....	11,829	3,567	554	....	....
South Carolina	....	....	....	42,145	11,217	329	7,644	14,651
South Dakota	....	....	....	823	1	....	....	....
Tennessee	....	1,489	....	1,015,723	546,500	8,610	164,826	75,565
Texas	....	....	....	77,513	47,252	90	....	18,898
Utah	....	....	845	427	....	....	....	....
Vermont	....	10,059	....	108,641	11,463	27,533	....	....
Virginia	....	....	....	641,583	387,937	6,104	114,503	13,760
Washington	....	....	....	1,779	106	389	....	....
West Virginia	....	....	....	907,547	456,424	53,782	154,581	2,952
Wisconsin	....	3,380	....	625,640	84,391	109,925	....	....
Wyoming	....	....	11,886	126	126	....	....	....
All other States[1]	....	....	....	730	....	....	....	....

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[1] Includes Nebraska and Nevada.

TABLE 18.—CUT OF LUMBER BY SPECIES AND CUT OF LATH AND SHINGLES, FOR EACH STATE: 1909—Continued.

State.	Hardwoods—Continued.							
	Chestnut.	Beech.	Birch.	Basswood.	Elm.	Cottonwood.	Ash.	Hickory.
	M feet.	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M feet.*
United States	663,891	511,244	452,370	399,151	347,456	265,600	291,209	333,929
Alabama	1,909	1,125	....	564	1,082	1,269	3,387	7,076
Arizona	....	....	....	....	....	....	....	....
Arkansas	....	78	138	605	13,056	54,507	33,212	45,133
California	....	....	....	....	....	....	....	....
Colorado	....	....	....	....	....	161	....	....
Connecticut	77,604	804	1,361	745	367	476	1,684	2,442
Delaware	752	82	30	....	3	....	61	81
Florida	....	....	....	....	5	307	282	1,393
Georgia	2,429	67	20	88	274	2,260	3,106	1,171
Idaho	....	....	....	....	....	5,446	....	....
Illinois	....	1,472	475	587	12,102	3,939	2,894	11,095
Indiana	2,789	98,729	1,216	13,917	40,364	4,143	23,488	23,513
Iowa	....	....	627	4,111	11,710	10,778	788	1,490
Kansas	....	....	....	....	720	586	116	1,034
Kentucky	35,648	36,953	1,040	10,056	10,130	1,537	14,958	41,656
Louisiana	....	581	....	....	1,341	47,509	11,200	7,704
Maine	171	9,638	62,812	4,123	910	2,012	2,572	93
Maryland	32,251	2,968	1,350	2,386	974	....	2,166	4,267
Massachusetts	28,831	4,685	8,908	1,296	366	799	2,879	658
Michigan	....	111,340	64,341	69,453	58,321	6,384	24,865	1,850
Minnesota	....	....	9,785	20,131	14,645	16,668	3,326	28
Mississippi	1,692	680	85	591	6,090	46,222	15,017	21,967
Missouri	....	325	1,115	1,090	27,913	17,987	12,685	33,259
Montana	....	....	....	....	....	510	....	....
New Hampshire	4,338	8,397	13,723	2,328	242	896	2,554	64
New Jersey	14,722	106	57	356	102	3	183	1,566
New Mexico	....	....	....	....	....	....	....	....
New York	18,829	42,334	31,990	36,058	16,280	....	12,747	1,426
North Carolina	49,738	880	658	6,387	404	309	4,476	3,132
Ohio	16,424	49,421	856	16,007	33,182	2,944	25,753	21,774
Oklahoma	....	....	48	2	2,140	9,585	2,879	2,572
Oregon	....	....	....	....	....	883	455	....
Pennsylvania	107,838	57,285	21,650	13,008	4,954	87	9,814	15,267
Rhode Island	6,936	20	148	....	6	50	236	172
South Carolina	629	15	....	....	19	2,048	2,219	170
South Dakota	....	....	....	....	....	810	12	....
Tennessee	71,962	18,341	1,274	11,463	10,688	12,380	18,709	58,477
Texas	....	62	99	97	703	3,354	5,348	922
Utah	....	....	....	....	....	427	....	....
Vermont	641	16,452	33,450	10,478	1,766	1,881	4,531	100
Virginia	67,996	2,238	843	9,658	244	254	5,590	5,528
Washington	....	....	....	....	....	769	215	....
West Virginia	119,762	36,722	14,579	29,679	881	352	9,171	16,552
Wisconsin	....	9,444	179,692	133,887	75,472	4,338	27,631	297
Wyoming	....	....	....	....	....	....	....	....
All other States[1]	....	....	....	....	....	730	....	....

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[1] Includes Nebraska and Nevada.

TABLE 18.—CUT OF LUMBER BY SPECIES AND CUT OF LATH AND SHINGLES, FOR EACH STATE: 1909—Continued.

State.	Hardwoods—Continued.					Lath.	Shingles.
	Tupelo.	Walnut.	Sycamore.	Cherry.	All other.		
	M feet.	*M feet.*	*M feet.*	*M feet.*	*M feet.*	*M.*	*M.*[1]
United States	96,676	46,108	56,511	24,594	37,557	3,703,195	14,907,371
Alabama	13,074	721	419	117	862	50,979	245,871
Arizona						7,816	583
Arkansas	6,084	544	5,406	332	525	78,362	208,080
California					26	32,615	574,342
Colorado						11,494	657
Connecticut	54	186	10	159	60	203	2,801
Delaware		6			4	1,086	570
Florida	7					55,741	283,206
Georgia	286	48	80	15	10	58,704	443,260
Idaho						86,740	62,308
Illinois	764	5,051	5,073	163	227	1,055	2,245
Indiana	262	7,669	11,003	1,969	1,330	3,600	7,340
Iowa		858	259	177	382	22,978	8,264
Kansas		1,114	355		150		
Kentucky	307	4,907	6,760	792	10,453	19,776	55,010
Louisiana	24,703		94		2,856	377,708	757,868
Maine				7	5	337,086	598,131
Maryland	225	362	904	872	337	17,583	12,352
Massachusetts		228	6	782	176	11,885	13,347
Michigan		184	749	1,587	666	218,308	891,649
Minnesota		28		8	16	478,008	74,818
Mississippi	6,146	33	379	5	1,493	90,926	151,303
Missouri	4,351	4,314	10,526	376	377	19,931	51,932
Montana						35,430	525
New Hampshire		4		586		26,873	30,132
New Jersey	10	78	15	16	154	19,143	35,727
New Mexico						10,571	150
New York				3,327		70,878	91,886
North Carolina	12,219	267	221	325	2,215	70,724	280,942
Ohio		8,580	5,243	2,105	2,453	17,508	3,227
Oklahoma	111	302	2,353	8	190	1,233	4,635
Oregon					51	161,512	293,644
Pennsylvania	19	1,762	562	4,324	884	143,059	79,336
Rhode Island		138		2			1,000
South Carolina	3,165	11	10	18		28,303	122,709
South Dakota						5,730	93
Tennessee	3,180	4,068	3,512	874	5,294	31,179	35,692
Texas	25	79	59		525	59,627	137,719
Utah						264	725
Vermont		5		285	56	7,249	24,001
Virginia	20,942	2,308	980	220	2,478	127,555	39,172
Washington					300	451,384	8,879,467
West Virginia	742	1,968	1,533	5,058	2,809	150,820	6,829
Wisconsin		285		85	193	299,845	392,863
Wyoming						1,224	960
All other States[2]						500	

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[1] A "thousand" (usually written M) shingles does not mean 1,000 pieces, as illustrated by the following extract from the grading rules of the Southern Cypress Manufacturers' Association: "The count of our manufacture of shingles, of all grades, is based on 4,000 linear inches in width, making 1,000 standard shingles. Consequently there would be only 667 6-inch shingles packed and counted as 1,000 standard shingles, 5-inch dimension being counted in like proportion."

[2] Includes Nebraska and Nevada.

The report by the Bureau of the Census and the Forest Service gives the following information regarding the species from which shingles and lath are produced.

OUTPUT OF SHINGLES BY SPECIES: 1909.

Species.	Output.	Species.	Output.
	M.[1]		*M.*[1]
Total	14,907,371	Spruce	147,132
Cedar	10,963,817	Chestnut	91,766
Cypress	1,386,722	Hemlock	76,029
Yellow pine	1,293,565	Western pine	68,934
Redwood	506,651	Oak	32,818
White pine	283,213	All other	56,724

[1] See footnote 1, p. 92.

Of this total of 14,907,371 M shingles cut in 1909, cedar constituted the material of 73.5 per cent, yellow pine and cypress of approximately 9 per cent each, and redwood of 3.4 per cent. The bulk of the cedar shingles were cut from the western red cedar, and were manufactured in the State of Washington. The shingle output of that State in 1909 was about three-fifths of that of the country. Considerable quantities of shingles of the eastern white cedar, or arbor vitæ, are manufactured in Michigan, Wisconsin, and Maine. The cypress shingles are cut chiefly in Louisiana, and the redwood shingles entirely in California.

Lath are chiefly a by-product of lumber manufacture, and are cut from so many kinds of timber that it is very difficult to get satisfactory reports upon the total production of any one kind. Consequently, only the total production of lath by States in 1909 is shown.

In the Lake States lath are chiefly manufactured from white pine and hemlock, in Washington from Douglas fir, and in the Southern States from yellow pine.

CHAPTER III.

CONCENTRATION OF TIMBER OWNERSHIP.

The concentration of timber ownership is discussed in this report solely with reference to timber within the investigation area. The amount here shown as concentrated in holdings of over 60 million feet each includes only holdings of over 60 million in the investigation area and therefore should not be compared with the estimate of the total privately owned timber in the United States, but only with that in the investigation area. To make the comparison with the total privately owned in the country it would, of course, be necessary to ascertain the large holdings outside the investigation area and include them with those inside. Though the Bureau made no investigation outside this area, general information which has come to its attention indicates the strong probability that a systematic canvass would reveal a very high degree of concentration in the ownership of the timber outside the investigation area, especially in the Appalachian region from Maine to northern Georgia, and in the southern Rockies. A considerable number of reports on large holdings outside the investigation area were secured by the Bureau, incidental to its main work. Many of these are holdings owned by large companies that also have important amounts of timber in the investigation area. In the same way, some information was obtained showing large investments by prominent American timber holders in Canadian and Mexican timber.

Section 1. Size groups used.

Except for the Southern Pacific Company, the Weyerhaeuser Timber Company, and the Northern Pacific Railway Company, the holdings of standing timber are shown in this chapter by size groups. The holdings of these three companies are stated separately in section 3, and in the tables they always constitute group 1. All other holdings are grouped according to the following limits:

Group 2: From 13,000,000,000 feet to 25,000,000,000 feet.
Group 3: From 5,000,000,000 feet to 13,000,000,000 feet.
Group 4: From 3,500,000,000 feet to 5,000,000,000 feet.
Group 5: From 2,000,000,000 feet to 3,500,000,000 feet.
Group 6: From 1,000,000,000 feet to 2,000,000,000 feet.
Group 7: From 500,000,000 feet to 1,000,000,000 feet.
Group 8: From 250,000,000 feet to 500,000,000 feet.
Group 9: From 125,000,000 feet to 250,000,000 feet.
Group 10: From 60,000,000 feet to 125,000,000 feet.
Group 11: Less than 60,000,000 feet.

Some of the holders in groups 2, 3, and 4 are named in the discussion of the tables. If a holding falls just within a group, the statement that it does fall there might be nearly equivalent, in the eyes of men familiar with the timber situation in the region, to a statement of its size. To avoid conveying in this way any definite information about particular holdings, four or five holders in the first few groups whose holdings were a little above the line which divides one group from another have been placed in the group below. If a holder is named as belonging to a group, he has at least a moderate amount more than the group minimum; he may possibly have a little more than the group maximum.

To give the reader an idea what a billion (1,000,000,000) feet of lumber means, the following illustrations are given: A billion feet of lumber would load a freight train 417 miles long, or it would build about 65,000 ordinary 5 or 6 room houses.

Section 2. Incompleteness of statistical measurements of concentration.

The concentration of timber ownership shown in this report is to be taken as only a minimum. The full amount and significance of concentration has not been ascertained, for the following reasons:

1. That there is an extensive interownership of stock not shown by the report.
2. That large holders control great quantities of timberland which they do not actually own.
3. That the large holdings, generally speaking, are of better quality than the small.

INTEROWNERSHIP OF STOCK NOT SHOWN.—There is a remarkable interweaving of interests among owners of timber, individual and corporate. It often happens that only a fraction of the timber under one control is held in any one name. Most of the important owners refused to furnish the information necessary to reveal the great concentration of control through personal and corporate relations. Yet only answers on this point (see question 7 of schedule, p. 275) would reveal the true concentration of the ownership of timber. Persistent effort was made to secure the information on stock holdings from those concerned and from others who might know the facts, and, as is shown below, separate owners of record were consolidated wherever sufficient evidence of one controlling interest was obtained. But nothing short of access to the stock books of all important timber-owning corporations would show the true situation. Therefore the degree of concentration set forth in this report is certainly much below that which actually exists.

Some corporations gave the information regarding stockholders and stock interests in other corporations; some individuals stated, apparently in good faith, their stock holdings in corporations connected with the lumber industry; and from independent sources some specific facts and much general information were gathered. This evidence was carefully considered, and where it was sufficient to show a common control through ownership the separate holdings so controlled were combined and treated as one in the tables of this chapter. Such combinations were not made because of mere common management or harmonious operation. The test was that of actual control through ownership of at least half the stock by the interest in question. If an individual owning timber had at least half the stock of a timber-owning corporation, the two holdings were combined as one. A corporation was combined with others in which it held a majority of the stock. In a number of important cases, the same few individuals appeared in several corporations as holding a majority of the stock in each, and the corporate holdings were therefore combined as one.

A vast amount of interrelation short of actual majority control was proved by the information obtained, but there is no way of presenting the precise measure of it. For instance, an important individual owner is known to be an officer or important stockholder of a corporation; two corporations have largely the same officers or stockholders; a corporation owns stock in other corporations; a few individuals are known to be interested in each of several corporations; or a few individuals are known to control a corporation, and these individuals appear separately as very important stockholders in a number of other corporations. In none of these cases were combinations made, and the various holdings are counted separately in the tables as though there were no connections. It is believed that actual majority control by the same interest would be proved in a great number of such cases if the full facts were known from the stock books.

At first thought, it might seem that some way could have been devised to show the approximate importance of such interrelations; that, for example, loose groups might have been made containing corporations connected by important stockholders. The chief difficulty here would have arisen from the production of an endless chain. One corporation is connected by important stockholders with others, these by other important stockholders with yet other corporations, and so on; the group becoming too loose to be serviceable.

Blocking in of small holdings.—Small tracts of standing timber can usually be handled alone only at a great disadvantage, and often not at all. Therefore, the big interests have a very important control of the small holders "blocked in" by them. The small holder can not log his timber, because there is no available market in which to sell the logs. He can sell the tract only to the one large holder or to one of a few large holders surrounding him, and if more than one they frequently have an understanding on the situation, often in the form of buying zones. It is very common for a large holder to speak of the amount of timber he "controls," meaning the amount he owns plus the small holdings wholly or practically surrounded by his holding. It is impossible to measure this control in any exact way. The subject will be mentioned in more detail in Part II.

GENERALLY BETTER QUALITY OF LARGE HOLDINGS.—Speaking generally, the large holdings are of better quality than the small, and can be logged at less cost per unit of product. It follows that they are of greater importance in the market than their size alone would indicate.

These considerations are especially important in the Southern Pine Region. They are applicable to most large holdings in the Pacific-Northwest, but not to those of the Southern Pacific Company and the Northern Pacific Railway Company, as the holdings of those companies were originally grants composed largely of alternate sections, and, further, the Northern Pacific has sold most of its best timber.

CONCENTRATION OF OWNERSHIP IN ENTIRE INVESTIGATION AREA.

Section 3. Southern Pacific, Weyerhaeuser Timber, and Northern Pacific companies.

The largest holders of standing timber in the United States are the Southern Pacific Company, the Weyerhaeuser Timber Company, and the Northern Pacific Railway Company.

The holding called by the name of the Southern Pacific Company in this report includes the timberland owned by the Oregon and California Railroad Company in Oregon; that of the Central Pacific Railway Company in California, together with about 75,000 acres owned by that company in Washoe County, Nev., just across the State line; and about 22,000 acres in Mendocino County, Cal., with less than 1.5 billion feet of timber, owned by the Albion Lumber Company. The Southern Pacific Company owns the stock of the Oregon and California Railroad Company and of the Central Pacific Railway Company. It has been reported from outside sources that in the latter part of 1907 the stock of the Albion Lumber Company was sold to Southern Pacific interests, and at the present time the current belief in timber circles is that the stock of the company is owned by the Southern Pacific and the Atchison, Topeka and Santa Fe interests. There seems to be no reasonable doubt regarding this control, but its exact form and extent are not known. The two railroad companies jointly own the entire capital stock of the Northwestern Pacific Railroad Company, which extends from San Francisco north into Mendocino County and near the holding of the Albion.

The Southern Pacific timber holding in California, as defined in this report, does not extend south of Eldorado County. It consists almost wholly of land acquired under Federal land grants by the California and Oregon Railroad Company and the Central Pacific Railroad Company, and now owned by the Central Pacific Railway Company. Besides this, it includes only the comparatively small holding of the Albion Lumber Company. The Southern Pacific has other great land interests arising from land grants in southern California, Nevada, and Utah, but this land bears very little timber. The Union Pacific, which dominates the Southern Pacific through the Oregon Short Line Railroad Company,[1] also has large land interests, but without an important amount of timber. These land interests of the Southern Pacific and the Union Pacific will be discussed in a subsequent Part. The Southern Pacific directly and through its subsidiary corporations has about 130,000 acres, with less than a billion feet of timber, in Texas and Louisiana. In order that the great Southern Pacific holding might be discussed as entirely in the Pacific-Northwest, the comparatively small amount owned in Texas and Louisiana has not been included in it, but is included instead in group 3. (See p. 131.) The addition may readily be made by those who wish the total.

The figures for the timber holding of the Southern Pacific in Oregon do not include 23,000 acres of unpatented land, and about 270,000 acres of unsurveyed land claimed by the company under the grant.

The Weyerhaeuser Timber Company owns all the stock except the officers' qualifying shares in the following corporations: Weyerhaeuser Land Company, Pokegama Sugar Pine Lumber Company, Pelton-Reid Sugar Pine Lumber Company, Weyerhaeuser Realty Company, and Weyerhaeuser Lumber Company. The Weyerhaeuser Timber Company owns timber in Washington and a little in Idaho, the Weyerhaeuser Land Company owns timber in Oregon, the Pokegama in Oregon, the Pelton-Reid in Oregon and a small acreage of nontimbered land in California, the Weyerhaeuser Realty a very small amount in California, and the Weyerhaeuser Lumber a very small amount in Washington. The Weyerhaeuser Timber Company holds one-half the stock of the Clarke County Timber Company, owning 26,928 acres and less than three-quarters of a billion feet in Washington, the remaining half of the stock being owned by the Davis Land Company. The Weyerhaeuser Land Company has an undivided three-quarters interest with the Western Pacific Land and Timber Company in about 5,000 acres in Oregon; the Weyerhaeuser Timber Company owns an undivided half interest with the Western Washington Logging Company in 1,800 acres in

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[1] See footnote on p. 17.

Washington, and an undivided half interest with the Davis Land Company in 2,240 acres in Washington. The timberland owned by the Weyerhaeuser Timber, Weyerhaeuser Land, Clarke County, Pokegama, Pelton-Reid, Weyerhaeuser Realty, and Weyerhaeuser Lumber companies, and the fractional parts of the three undivided interests are included in this report under the name of the Weyerhaeuser Timber Company.

For other timberland in which Mr. Frederick Weyerhaeuser and associates are interested, see page 101.

Nearly all the timber included in this report under the name of the Northern Pacific Railway Company is owned by that company direct, but about 160,000 acres are owned by the Northwestern Improvement Company. All the stock of the Northwestern Improvement Company is owned by the Northern Pacific.

The amount of timber owned by each of these great holders is shown below, by States.

TABLE 19.—TIMBER HOLDINGS OF THE SOUTHERN PACIFIC, WEYERHAEUSER TIMBER, AND NORTHERN PACIFIC COMPANIES.

[In billions of board feet. Thus, 105.6=105,600,000,000 board feet.]

State.	Southern Pacific.[1]	Weyerhaeuser Timber.	Northern Pacific.[2]	Total.
Pacific-Northwest	105.6	95.7	36.2	237.5
California	[3] 35.1	.1		35.2
Oregon	70.5	18.7		89.2
Washington		76.9	25.2	102.1
Idaho			4.5	4.5
Montana			6.5	6.5

[1] As given in this and other tables the figures for this holding exclude something less than a billion feet owned in Texas and Louisiana.

[2] Holds about 37,000 acres in Minnesota in the name of Northwestern Improvement Company, but the small amount of timber on this land is not included in the table.

[3] Includes the timber in Washoe County, Nev., mentioned on p. 97.

The Southern Pacific, Weyerhaeuser Timber, and Northern Pacific companies own 106, 96, and 36 billion feet of standing timber, respectively, in the Pacific-Northwest. The Southern Pacific owns 14.1 per cent of the privately owned timber in California and 17.7 per cent of that in Oregon; the Weyerhaeuser Timber Company owns 4.7 per cent of the privately owned timber in Oregon and 26.1 per cent of that in Washington; the Northern Pacific owns 8.6 per cent of the privately owned timber in Washington, 8.9 per cent of that in Idaho, and 29.8 per cent of that in Montana. The Southern Pacific and the Weyerhaeuser Timber, together, have 22.4 per cent of the privately owned timber in Oregon; and the Weyerhaeuser Timber and Northern Pacific together have 34.7 per cent of that in Washington. The three companies together have 23.5 per cent of all privately owned timber in the five States of the Pacific-Northwest.

The entire holding of the Southern Pacific in Oregon lies west of the Cascades, except that in Klamath County. The entire holding of the Weyerhaeuser Timber Company in Washington lies west of the Cascades, while its holding in Oregon is about three-fourths west of the Cascades and the remainder in Klamath and Lake counties. About two-thirds of the holding of the Northern Pacific in Washington is west of the Cascades. The Southern Pacific and the Weyerhaeuser Timber, together, own 25.8 per cent of the privately owned timber in Oregon and Washington west of the Cascades; and they and the Northern Pacific have 28.4 per cent.

The two enormous timber holdings of the country are those of the Southern Pacific and the Weyerhaeuser Timber companies. The 201 billion feet of timber in them would supply all the sawmills in Washington, Oregon, and California for twenty-nine years at the rate of the present annual output, and it would supply all the 46,584 sawmills in the United States (in 1909) for four and one-half years. Adding the Northern Pacific to these two companies, the total of 238 billion feet would supply all the sawmills in the five States of the Pacific-Northwest for thirty years at the rate of the present annual output, and all the sawmills in the United States for five and one-third years.

These three holdings have enough standing timber to build an ordinary 5- or 6-room frame house for each of the 16,000,000 families in the United States in 1900. If sawed into lumber and placed in cars, their timber would load a train about 100,000 miles long.

The Southern Pacific and the Northern Pacific are not cutting any timber, and the logging operations of the Weyerhaeuser Timber Company are small compared with its holding. All the companies have great financial strength and so are able to hold the timber for the higher prices of the future. As is shown on page 88, over four-fifths of the present cut of lumber is from the timber in the eastern part of the United States, and with this rapid depletion of the supply there the country must turn more and more to the Pacific-Northwest. This, together with the cutting of the smaller holdings in that region, will give these three great holdings an increasing importance in the future. Furthermore, as is shown later, the Weyerhaeuser Timber Company has very important connections with other great timber-owning corporations in the Pacific-Northwest, and the interests in them are also powerful in the Southern Pine Region and in the Lake States. Eighty per cent of the timberland owned by the Weyerhaeuser Timber Company has been purchased from the Northern Pacific Railway Company since January 1, 1900, and there is some indication that the two companies may have important identical stockholders. Other companies connected with the Weyerhaeuser Timber Company have also purchased large amounts of timberland from the Northern Pacific. There is some indication of considerable interrelation between the individuals of the Southern Pacific interests and other large timber-owning corporations on the Pacific coast.

The weight of lumber is great compared with its value, and consequently the industry is especially subject to the influence of transportation conditions. The Southern Pacific and the Northern Pacific thus become still more powerful factors in the lumber industry. In this connection, it may be noted that the Chicago, Milwaukee and Puget Sound Railway Company (subsidiary to the Chicago, Milwaukee and St. Paul Railway Company) and the Great Northern Railway Company also have important timber interests in the Pacific-Northwest.

As is shown in Chapter VI, the great holdings of the Southern Pacific, Weyerhaeuser Timber, and Northern Pacific companies have all resulted from railroad land grants, and patents for some of the land have not yet been issued; and all that owned by the Southern Pacific in Oregon is involved in the case of the United States *v.* The Oregon and California Railroad Company et al.

INTERRELATIONS OF MR. FREDERICK WEYERHAEUSER AND OTHER LARGE TIMBER HOLDERS.—The Weyerhaeuser Timber Company gave information regarding the corporations in which it owned stock, but it refused to furnish a list of its stockholders and the amount of stock owned by each. From the list of officers and directors, and from outside sources, a number of men have been recognized as apparently important stockholders in the company. Mr. Frederick Weyerhaeuser furnished informally a list of companies in which he is interested, together with the amount of stock in each owned by him and members of his family. This list has not been verified by access to the stock books of the corporations or other records. A comparatively large number of men influential in the industry have been close associates of Mr. Weyerhaeuser for many years, and in lumber circles he is usually credited with being the most influential person in the timber and lumber companies in which he is interested.

The companies with which Mr. Weyerhaeuser or some of his associates are identified make an important list of connected interests, which can be discussed best by groups as follows: 1. The Weyerhaeuser Timber Company. 2. Group A, consisting of other companies in which Mr. Weyerhaeuser is interested. 3. Group B, consisting of companies, other than those in A, in which one or more stockholders of the Weyerhaeuser Timber Company are interested. 4. Group C, consisting of companies, other than those in A and B and the Weyerhaeuser Timber Company, in which one or more associates of Mr. Weyerhaeuser in the companies of group A are interested. The amount of timber owned by these groups, so far as they are known, is shown below in billions of board feet:

	Total.	Pacific-Northwest.	Southern Pine Region.	Lake States.
Weyerhaeuser Timber Co	95.7	95.7	....	....
Group A	49.5	35.3	7.3	6.9
Group B	65.1	48.3	14.7	2.1
Group C	81.6	49.2	26.7	5.7
Total	291.9	228.5	48.7	14.7

The above table does not include any of the great railroad holdings.

The stockholders of the Weyerhaeuser Timber Company are known to be interested in the enormous total of 210 billion feet, including the company holding itself and those of groups A and B.

According to the informal statement mentioned above, Mr. Weyerhaeuser owns from 10 to 60 per cent of the stock in each company included in group A, and about three-fourths of the timber in that group is owned by companies in which he holds from 20 to 60 per cent of the capital stock. There is, of course, a marked interrelation among the companies in these four groups through other stockholdings than those on which each particular group is based. Some of the stockholders in the Weyerhaeuser Timber Company and other associates of Mr. Weyerhaeuser are also important stockholders in the companies of group A, and, likewise, some of the stockholders in each group are stockholders in each of the other groups. As a rule, each company in these groups is connected with others by more than one stockholder. If the ownership of stock in each company were fully known, much stronger connections might appear. Important companies which have not been included might be included if the Bureau's information were complete. Moreover, companies which have been included may own stock in timber-owning corporations not included. For instance, such stock may be held by the timber-owning and other companies in which Mr. Weyerhaeuser is a stockholder. A few cases of this kind are known.

From the very incomplete information at hand it appears, as the above table shows, that the companies in which Mr. Weyerhaeuser owns stock, other than the Weyerhaeuser Timber Company, own 49.5 billion feet; that the companies in which other known stockholders of the Weyerhaeuser Timber Company own stock and in which Mr. Weyerhaeuser is not known to own stock have 65.1 billion feet; and that the companies in which the associates of Mr. Weyerhaeuser own stock and in which neither he nor the known stockholders of the Weyerhaeuser Timber Company are known to be interested own 81.6 billion feet; a total of 291.9 billion feet owned by companies which, broadly speaking, are under the influence of Mr. Weyerhaeuser and his important associates. This total of 291.9 billion feet is divided by regions as follows: Pacific-Northwest, 228.5 billion feet; Southern Pine Region, 48.7 billion feet; and Lake States, 14.7 billion feet. It is important to note that nearly all this timber in the Southern Pine Region is in valuable virgin forests of longleaf and shortleaf pine in Arkansas, Louisiana, Mississippi, and Florida. Very little of the low-priced hardwoods is included in the reports for these companies in the Southern Pine Region and in Minnesota. Generally speaking, the companies in these groups have timber of the most valuable class in their localities, and further, by reason of the conditions described on page 96, their holdings "block in" a large amount of timber owned by small holders.

While the control of one company in these groups may lie with certain individuals and the control of another company with certain other individuals, there is a remarkable interweaving of interests among the various companies. As a whole they are controlled by a comparatively small number of persons closely united in subgroups through long business connection and often through family relationship. There is a very marked general spirit of harmony and cooperation among them. An extensive consolidation among these interests may easily be brought about at any time when circumstances favor it.

It is important to state that the companies of groups B and C have stockholders, other than those upon whom the groups are based, who hold stock in important companies outside these groups; and beyond these companies again another circle of companies might be formed, and so on.

It is also very important to note that the significant connection between the holdings making up the above 291.9 billion feet finds no expression in the tables of this report. Each holding involved in groups A, B, and C is counted separately in the tables and placed in its proper ownership group according to its individual size. Thus, this significant but more or less intangible affiliation of the Weyerhaeuser Timber Company and the holders of groups A, B, and C is an illustration of the point made in section 2, that there is a vast but unknown amount of concentration of ownership beyond that which could be shown in the tables presented.

The 292 billion feet owned by the companies described above, with the 106 billion of the Southern Pacific, the 36 billion of the Northern Pacific, and the 102 billion of the five holders discussed in section 4, make a total of 536 billion feet, or 31 per cent of all the privately owned timber in the investigation area, in the hands of a few interests. Beyond this is the fact that these companies as a rule own the most valuable timber in their localities; that they control, by "blocking in," a large amount of additional timber owned by small holders; that many important timber-owning companies not here included are connected with companies that are included, as the above paragraph indicates, through men who have stock in one and another; and that the more valuable timber outside this group of interests is owned in large part by a comparatively few companies, many of which are interrelated.

Section 4. The five holdings in group 2.

The five holdings in group 2, ranging from 13 to 25 billion, total 102 billion feet, 0.6 billion of which is in Minnesota and Michigan and the rest in the Pacific-Northwest, as follows: California, 49.0 billion; Oregon, 34.6; Washington, 14.8; and Idaho, 3.0. These five holdings, in order of size, are as follows:

1. A number of companies controlled by Charles A. Smith, of Minneapolis, Minn., and having largely the same minor stockholders. Nearly all the timber is owned by the following corporations: The C. A. Smith Fir Company, the C. A. Smith Timber Company, and the Linn and Lane Timber Company, in Oregon, and the C. A. Smith Redwood Company and the C. A. Smith Sugar Pine Company, in California.
2. The personal holding of Thomas B. Walker, of Minneapolis, Minn., in California, and a small company holding in Minnesota.
3. A number of companies in which N. P. Wheeler and W. E. Wheeler, brothers, of Endeavor, Pa., are the chief stockholders. N. P. Wheeler and W. E. Wheeler have more than a majority interest in about two-fifths of the total timber in the holding; they, together with J. E. Wheeler, son of W. E. Wheeler, and one other stockholder, have more than a majority interest in about two-fifths more; and they appear to be the chief stockholders in the remaining fifth, although their exact interest is not known. A small number of individuals own the rest of the stock in these companies, and while they are not each interested in every company the community of ownership is far greater than is indicated by the interest of the Wheelers alone. The Wheelers also have timber interests outside the investigation area, which have not been reported.
4. A. B. Hammond Company of New Jersey, Hammond Lumber Company of Delaware, Hammond Lumber Company of New Jersey, Vance Redwood Company, Curtis Lumber Company, Oregon Rafting Company, and Western Oregon Company. A. B. Hammond, of San Francisco, is apparently the largest stockholder in the A. B. Ham-

mond Company. That corporation owns, directly or indirectly, all or most of the stock of all the others named, and also that of the following companies which do not own timber: National Lumber Company, capital stock $500,000, engaged in the distribution of lumber; Oakland Sash and Door Company, capital stock $50,000, engaged in the sash and door trade; Humboldt Door and Sash Company, capital stock $50,000, engaged in the manufacture of sash and doors; and the Oregon and Eureka Railroad Company, capital stock $125,000, operating a railroad between Eureka and Trinidad, Cal. The A. B. Hammond Company, the Hammond Lumber Company of New Jersey, the Vance Redwood Company, and the Curtis Lumber Company own large amounts of timber; the Oregon Rafting and Western Oregon companies own small amounts; the Hammond Lumber Company of Delaware owns only stock. The timber credited to the A. B. Hammond Company is one-half of a joint holding with the Winton Timber Company. It is not known whether there is any stock connection between these companies. Part of the timber credited to the Hammond Lumber Company of New Jersey is its proportion of three joint holdings, the largest of which is held with the Hill-Davis Company. It is not known whether there are stock connections between this company and the Hammond companies. A. B. Hammond and members of the Hill-Davis Company are associated in a very important Oregon timber-owning company not in this group. H. E. Huntington is a director in one of the principal Hammond companies and also a director of the Southern Pacific Company and of its two timber-owning subsidiaries, the Central Pacific and Oregon and California railroad companies.

5. The timber interests of the Chicago, Milwaukee and Puget Sound Railway Company (subsidiary to the Chicago, Milwaukee and St. Paul Railway Company), nearly all in the name of the Milwaukee Land Company.

Section 5. Concentration of ownership, by size groups.

In Table 20 the holdings are grouped according to their size in the investigation area. The figures in italics opposite "Investigation area" show the number of holdings in each group, and the figures in italics opposite each of the three geographic divisions show the number of the holders in each group who own in that division. These figures show, for each geographic division, not the numbers of holdings of the indicated sizes therein, but the numbers of holdings, lying wholly or partly therein, which have the indicated sizes in the investigation area. The sums of the numbers for the three divisions are greater than the numbers for the investigation area because some holdings lie partly in one division and partly in another. In a small number of cases, chiefly in the Southern Pine Region and the Lake States, where the portion of a holding in one division is less than about 15 per cent of the minimum limit of the group, the holding has been excluded from the count of the number of holdings for that division. This was done to keep the insignificant parts of some holdings from obscuring the number of important holders that practically constitute the group in a given region. A further explanation is given in a footnote to Table 20.

The size groups are described on page 94. Group 11, which embraces all holdings of less than 60 million feet, must not be supposed to consist of small and scattered holdings, such as "farmers' wood lots." A large part of the timber in this group is in holdings worth $100,000 or more apiece; not a little in holdings worth $200,000 and $300,000; some of it in holdings worth $500,000 or more. A holding of 25 million feet of southern yellow pine at $4 a thousand is worth $100,000; 40 million feet of cypress at $8 a thousand is worth over $300,000; 50 million feet of white pine at $10 is worth $500,000. Such holdings are "small" only when compared with the enormous holdings discussed in this report.

One such holding will overbalance a great many farmers' wood lots, both in extent and in value. In the South or the Lake States a holding of 50 million feet may mean a tract of 10,000 or 15,000 acres. Suppose a farmer has 50 acres of timber, with a stand of 5,000 feet to the acre. That is 250,000 feet. In most cases it will consist of the cheaper sorts; it is shown below (p. 134) that timber is the more certainly gathered into large holdings in proportion as it is more desirable. If the farmer's 250,000 feet is worth $1 a thousand, the whole value of it is $250; at $2 a thousand it would be worth $500; at $5 a thousand it would be worth only $1,250.

Persons of small means are not so likely as the large capitalist to share in the gain of timber speculation, even in proportion to their means. Persons whose property is small are likely to want a current income from it; timber held for the rise gives no current income. The small absentee owner can do nothing to protect his property from theft—a danger to which timber is particularly liable; and the speculative owner is apt to be an absentee. Moreover, timber is ill fitted for speculation on a small scale, because, as is fully shown in Chapter V (p. 178), the small owner usually gets materially less than the large owner for precisely similar stumpage.

TABLE 20.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA, GROUPED BY SIZE.

In billions of board feet. Thus, 237.5=237,500,000,000 board feet. Each holding is grouped according to its total in the investigation area. See p. 94 for description of the groups, and p. 105 for explanation of the figures in italics.[1]]

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Investigation area.....	1,747.0	*3* 237.5	*5* 102.0	*14* 119.5	*26* 115.3	*42* 116.2	*105* 149.2	*190* 132.4	*273* 96.4	*489* 84.8	*655* 55.5	*1,802* 1,208.8	538.2
Pacific-Northwest..........	1,013.0	*3* 237.5	*5* 101.4	*12* 97.4	*18* 71.0	*26* 64.6	*67* 91.9	*86* 59.2	*96* 34.3	*176* 31.8	*222* 18.3	*711* 807.4	205.6
California...............	248.1	35.2	49.0	24.9	27.5	21.2	26.4	12.4	5.2	4.2	3.3	209.3	38.8
Oregon.................	398.1	89.2	34.6	33.3	26.7	24.4	39.9	23.3	13.7	12.7	7.6	305.4	92.7
Washington............	294.6	102.1	14.8	11.8	14.1	16.8	22.9	21.8	12.3	13.8	6.8	237.2	57.4
Idaho..................	50.4	4.5	3.0	19.1	1.0	2.0	2.7	1.6	2.3	1.1	.3	37.6	12.8
Montana................	21.8	6.5	.....	8.3	1.7	.2	.....	.1	.8	.....	.3	17.9	3.9
Southern Pine Region......	634.0	.....	.....	*3* 22.1	*8* 32.7	*18* 47.9	*38* 50.2	*92* 58.7	*148* 51.3	*251* 42.0	*367* 31.4	*925* 336.3	297.7
Missouri (part)..........	9.9	.....	.....	.....	.....	.3	1.2	1.7	.4	.9	.7	5.2	4.7
Arkansas...............	78.7	.....	.....	.....	2.9	3.5	6.1	8.3	7.8	5.2	4.1	37.9	40.8
Texas..................	66.0	.....	.....	11.2	3.6	6.0	.6	4.9	4.2	3.3	2.7	36.5	29.5
Louisiana..............	119.8	.....	.....	3.7	15.2	14.8	15.8	11.4	9.4	7.5	5.0	82.8	37.0
Mississippi.............	95.3	.....	.....	6.5	4.3	7.9	7.7	4.6	7.2	5.5	4.1	47.8	47.5
Alabama................	56.3	.....	.....	.....	1.0	.9	2.6	7.4	3.6	3.8	2.4	21.7	34.6
Florida.................	73.9	.....	.....	.6	.7	7.4	11.9	13.6	10.0	8.4	5.6	58.2	15.7
Georgia (part)..........	46.0	.....	.....	.....	.....	2.2	1.1	.2	3.2	1.9	2.3	10.9	35.1
South Carolina (part)...	30.7	.....	.....	.1	.....	3.3	.4	3.1	2.0	2.2	2.1	13.2	17.5
North Carolina (part)...	42.9	.....	.....	.....	4.9	.3	2.4	2.9	3.2	3.0	1.7	18.4	24.5
Virginia (part)..........	14.5	.....	.....	.....	.1	1.3	.4	.6	.3	.3	.7	3.7	10.8
Lake States................	100.0	.....	.6	.....	*4* 11.6	*6* 3.7	*7* 7.1	*27* 14.5	*34* 10.8	*69* 11.0	*68* 5.8	*215* 65.1	34.9
Michigan...............	47.6	.....	.2	.....	6.0	1.6	3.4	6.4	5.0	5.8	2.8	31.2	16.4
Wisconsin..............	29.2	.....	.....	.....	.6	2.1	2.0	5.9	4.8	4.4	2.2	22.0	7.2
Minnesota..............	23.2	.....	.4	.....	5.0	.....	1.7	2.2	1.0	.8	.8	11.9	11.3

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[1] As noted in the text, in a few instances small fractions of holdings have been included in the above table without also coumting the holder in the italicized entries. The number of such holders not included in the italicized entries, and the amount of timber in hundredths of a billion feet owned by them (the timber being included in the above table) are given below:

	Group number—				
	3	4	5	6	7
Pacific-Northwest..	....	....	*1* 0.05	*1* 0.15	....
Southern Pine Region....................................	*1* 0.59	*1* 0.61	*2* .64	*2* .25	*2* 0.1
Lake States...	....	*1* .61	*2* .16	*1* .12	....

The above table shows the absolute amount of timber owned by each group of holders.

Concentration of ownership is brought out more clearly in Table 21. That table shows what percentage of the total timber falls within each group and also the number of holders in each group. These percentages are based on the figures in Table 20. Thus, 6.7 per cent of all the timber in the investigation area is owned by the 42 holders in group 5 (each having from 2,000,000,000 to 3,500,000,000 feet). Twenty-six of these holders have all or part of their holdings in the Pacific-Northwest, 18 in the Southern Pine Region, and 6 in the Lake States. This illustrates the point mentioned in the first paragraph of this section, that the sum of the numbers of holders in the three geographic divisions is greater than the number in the investigation area. Likewise, no opinion as to the number of holders in a particular State can be drawn from the number shown for the geographic division.

TABLE 21.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION BY SIZE GROUPS, IN PERCENTAGES.

[Percentages computed from Table 20. See note at head of Table 20.]

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
		3	*5*	*14*	*26*	*42*	*105*	*190*	*273*	*489*	*655*	*1,802*	
Investigation area	100.0	13.6	5.8	6.8	6.6	6.7	8.5	7.6	5.5	4.9	3.2	69.2	30.8
		3	*5*	*12*	*18*	*26*	*67*	*86*	*96*	*176*	*222*	*711*	
Pacific-Northwest	100.0	23.5	10.0	9.6	7.0	6.4	9.1	5.8	3.4	3.1	1.8	79.7	20.3
California	100.0	14.2	19.8	10.0	11.1	8.6	10.6	5.0	2.1	1.7	1.3	84.4	15.6
Oregon	100.0	22.4	8.7	8.4	6.7	6.1	10.0	5.9	3.4	3.2	1.9	76.7	23.3
Washington	100.0	34.6	5.0	4.0	4.8	5.7	7.8	7.4	4.2	4.7	2.3	80.5	19.5
Idaho	100.0	8.9	5.9	37.9	2.0	4.0	5.3	3.2	4.6	2.2	.6	74.6	25.4
Montana	100.0	29.8	.....	38.1	7.8	.9	.....	.4	3.7	.....	1.4	82.1	17.9
				3	*8*	*18*	*38*	*92*	*148*	*251*	*367*	*925*	
Southern Pine Region	100.0	.....	.....	3.5	5.2	7.5	7.9	9.3	8.1	6.6	4.9	53.0	47.0
Missouri (part)	100.0	.....	.....	.....	.....	3.0	12.1	17.2	4.0	9.1	7.1	52.5	47.5
Arkansas	100.0	.....	.....	.....	3.7	4.5	7.8	10.5	9.9	6.6	5.2	48.2	51.8
Texas	100.0	.....	.....	17.0	5.4	9.1	.9	7.4	6.4	5.0	4.1	55.3	44.7
Louisiana	100.0	.....	.....	3.1	12.7	12.3	13.2	9.5	7.8	6.3	4.2	69.1	30.9
Mississippi	100.0	.....	.....	6.8	4.5	8.3	8.1	4.8	7.6	5.8	4.3	50.2	49.8
Alabama	100.0	.....	.....	.....	1.8	1.6	4.6	13.1	6.4	6.7	4.3	38.5	61.5
Florida	100.0	.....	.....	.8	1.0	10.0	16.1	18.4	13.5	11.4	7.6	78.8	21.2
Georgia (part)	100.0	.....	.....	.....	.....	4.8	2.4	.4	7.0	4.1	5.0	23.7	76.3
South Carolina (part)	100.0	.....	.....	.3	.....	10.8	1.3	10.1	6.5	7.2	6.8	43.0	57.0
North Carolina (part)	100.0	.....	.....	.....	11.4	.7	5.6	6.7	7.5	7.0	4.0	42.9	57.1
Virginia (part)	100.0	.....	.....	.....	.7	9.0	2.7	4.1	2.1	2.1	4.8	25.5	74.5
					4	*6*	*7*	*27*	*34*	*69*	*68*	*215*	
Lake States	100.0	.....	.6	.....	11.6	3.7	7.1	14.5	10.8	11.0	5.8	65.1	34.9
Michigan	100.0	.....	.4	.....	12.6	3.4	7.1	13.4	10.5	12.2	5.9	65.5	34.5
Wisconsin	100.0	.....	.....	.....	2.1	7.2	6.8	20.2	16.4	15.1	7.5	75.3	24.7
Minnesota	100.0	.....	1.7	.....	21.6	.....	7.3	9.5	4.3	3.5	3.4	51.3	48.7

The degree of concentration is brought out still more prominently by cumulative addition of the percentages shown in the above table. The result of such cumulative addition is given in Table 22.

TABLE 22.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION BY SIZE GROUPS, SHOWN CUMULATIVELY IN PERCENTAGES.

[Computed by adding the percentages in Table 21.]

	Group 1.	Groups 1–2.	Groups 1–3.	Groups 1–4.	Groups 1–5.	Groups 1–6.	Groups 1–7.	Groups 1–8.	Groups 1–9.	Groups 1–10.	Groups 1–11.
	3	*8*	*22*	*48*	*90*	*195*	*385*	*658*	*1,147*	*1,802*	
Investigation area..........	13.6	19.4	26.2	32.8	39.5	48.0	55.6	61.1	66.0	69.2	100.0
	3	*8*	*20*	*38*	*64*	*131*	*217*	*313*	*489*	*711*	
Pacific-Northwest................	23.5	33.5	43.1	50.1	56.5	65.6	71.4	74.8	77.9	79.7	100.0
California......................	14.2	34.0	44.0	55.1	63.7	74.3	79.3	81.4	83.1	84.4	100.0
Oregon..........................	22.4	31.1	39.5	46.2	52.3	62.3	68.2	71.6	74.8	76.7	100.0
Washington......................	34.6	39.6	43.6	48.4	54.1	61.9	69.3	73.5	78.2	80.5	100.0
Idaho...........................	8.9	14.8	52.7	54.7	58.7	64.0	67.2	71.8	74.0	74.6	100.0
Montana.........................	29.8	29.8	67.9	75.7	76.6	76.6	77.0	80.7	80.7	82.1	100.0
			3	*11*	*29*	*67*	*159*	*307*	*558*	*925*	
Southern Pine Region............	......	......	3.5	8.7	16.2	24.1	33.4	41.5	48.1	53.0	100.0
Missouri (part).................	......	......	......	......	3.0	15.1	32.3	36.3	45.4	52.5	100.0
Arkansas........................	......	......	......	3.7	8.2	16.0	26.5	36.4	43.0	48.2	100.0
Texas...........................	......	......	17.0	22.4	31.5	32.4	39.8	46.2	51.2	55.3	100.0
Louisiana.......................	......	......	3.1	15.8	28.1	41.3	50.8	58.6	64.9	69.1	100.0
Mississippi.....................	......	......	6.8	11.3	19.6	27.7	32.5	40.1	45.9	50.2	100.0
Alabama.........................	......	......	......	1.8	3.4	8.0	21.1	27.5	34.2	38.5	100.0
Florida.........................	......	......	.8	1.8	11.8	27.9	46.3	59.8	71.2	78.8	100.0
Georgia (part)..................	......	......	......	......	4.8	7.2	7.6	14.6	18.7	23.7	100.0
South Carolina (part)...........	......	......	.3	.3	11.1	12.4	22.5	29.0	36.2	43.0	100.0
North Carolina (part)...........	......	......	......	11.4	12.1	17.7	24.4	31.9	38.9	42.9	100.0
Virginia (part).................	......	......	......	.7	9.7	12.4	16.5	18.6	20.7	25.5	100.0
				4	*10*	*17*	*44*	*78*	*147*	*215*	
Lake States.....................	......	.6	.6	12.2	15.9	23.0	37.5	48.3	59.3	65.1	100.0
Michigan........................	......	.4	.4	13.0	16.4	23.5	36.9	47.4	59.6	65.5	100.0
Wisconsin.......................	......	......	......	2.1	9.3	16.1	36.3	52.7	67.8	75.3	100.0
Minnesota.......................	......	1.7	1.7	23.3	23.3	30.6	40.1	44.4	47.9	51.3	100.0

The great importance of group 1 has been discussed in section 3. The above tables show a remarkable concentration of ownership in the Pacific-Northwest. Three companies own almost one-fourth of the privately owned timber in that region, 8 own one-third, 20 own 43 per cent, and 37 own one-half. (Table 22 indicates that it takes 38 holdings to make half the timber in the Pacific-Northwest, but 2 of these holdings are largely in the South, and if in the place of the 2 be put 1 western holding from group 5 the 37 holdings thus obtained include half the timber in the region.) A few of these 37 owners have additional timber in the Southern Pine Region and the Lake States, totaling about 9 billion feet.

The 313 holders in groups 1 to 8 own three-fourths of the privately owned timber in the Pacific-Northwest, while the 398 holders in groups 9 and 10 own only one-twentieth. Group 11, which contains all privately owned timber not reported in holdings of 60 million feet or more, comprises only 20 per cent.

The 20 holders in groups 1 to 3, each holder having more than 5 billion feet in the investigation area, own about 40 per cent of the privately owned timber in Oregon, about 45 per cent of that in California and Washington, more than half of that in Idaho, and more than two-thirds of that in Montana. Group 11 ranges from less than 16 per cent of the whole in California to 25 per cent in Idaho.

The degree of concentration is far less in the Southern Pine Region than in either the Pacific-Northwest or the Lake States. While more than one-third of all the timber in the Pacific-Northwest is owned by 8 holders it takes 159 holdings to represent the same proportion in the Southern Pine Region. In the Lake States 44 holdings have 37.5 per cent of all the timber.

HOLDINGS IN EACH GEOGRAPHIC DIVISION GROUPED BY SIZE IN THAT DIVISION.—The three geographic divisions are widely separated territorially, and for some purposes the grouping of the timber holdings in each by size therein, independently of the other divisions, is more serviceable than the grouping by size in the investigation area. The three tables below present this independent grouping for each of the geographic divisions. Thus, in the first of the three tables, the column headed "Group 3" shows that 11 holders have each between 5 and 13 billion feet of timber in the Pacific-Northwest, and that the total of these 11 holdings in that region is 93.5 billion feet, distributed by States as follows: California, 24.9; Oregon, 29.4; Washington, 11.8; Idaho, 19.1; Montana, 8.3.

TABLE 23.—HOLDINGS OF STANDING TIMBER IN THE PACIFIC-NORTHWEST, GROUPED BY SIZE.

[In billions of board feet. Thus, 1,013.0=1,013,000,000,000 board feet. Each holding is grouped according to its total in the Pacific-Northwest. See page 94 for description of the groups. The number of holdings in each group is shown in italics.]

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
		3	*5*	*11*	*16*	*25*	*65*	*86*	*101*	*174*	*227*	*713*	
Pacific-Northwest.	1,013.0	237.5	101.4	93.5	67.3	65.8	93.7	61.1	36.5	31.8	18.8	807.4	205.6
California	248.1	35.2	49.0	24.9	24.0	24.1	26.2	13.0	5.2	4.4	3.3	209.3	38.8
Oregon	398.1	89.2	34.6	29.4	29.2	24.3	39.4	24.3	14.7	12.3	8.0	305.4	92.7
Washington	294.6	102.1	14.8	11.8	11.4	17.1	23.5	22.1	13.5	14.0	6.9	237.2	57.4
Idaho	50.4	4.5	3.0	19.1	1.0	.3	4.4	1.6	2.3	1.1	.3	37.6	12.8
Montana	21.8	6.5	......	8.3	1.7	.....	.2	.1	.8	......	.3	17.9	3.9

TABLE 24.—HOLDINGS OF STANDING TIMBER IN THE SOUTHERN PINE REGION, GROUPED BY SIZE.

[In billions of board feet. Thus, 634.0=634,000,000,000 board feet. Each holding is grouped according to its total in the Southern Pine Region. See page 94 for description of the groups. The number of holdings in each group is shown in italics.]

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Southern Pine Region........	634.0	......	......	*3* 21.6	*6* 26.6	*18* 49.2	*36* 50.2	*90* 60.1	*156* 54.3	*251* 42.4	*373* 31.9	*933* 336.3	297.7
Missouri (part)........	9.9	......	......	....		.3	1.2	1.7	.4	.9	.7	5.2	4.7
Arkansas.............	78.7	......	......	1.4		5.0	6.1	8.2	7.6	5.3	4.3	37.9	40.8
Texas.................	66.0	......	......	12.6		6.0	2.1	5.6	4.2	3.3	2.7	36.5	29.5
Louisiana.............	119.8	......	......	18.3		15.0	15.8	11.2	9.7	7.6	5.2	82.8	37.0
Mississippi...........	95.3	......	......	10.8		6.8	7.3	4.9	8.2	5.6	4.2	47.8	47.5
Alabama..............	56.3	......	......	....		1.2	1.9	7.9	4.4	3.9	2.4	21.7	34.6
Florida...............	73.9	......	......	....		7.8	11.5	13.8	11.1	8.4	5.6	58.2	15.7
Georgia (part).........	46.0	......	......	....		2.2	1.1	.2	3.2	1.9	2.3	10.9	35.1
South Carolina (part)..	30.7	......	......	.1		3.3	.4	3.1	2.0	2.2	2.1	13.2	17.5
North Carolina (part).	42.9	......	......	4.9		.3	2.4	2.9	3.2	3.0	1.7	18.4	24.5
Virginia (part)........	14.5	......	......	.1		1.3	.4	.6	.3	.3	.7	3.7	10.8

TABLE 25.—HOLDINGS OF STANDING TIMBER IN THE LAKE STATES, GROUPED BY SIZE.

[In billions of board feet. Thus, 100.0=100,000,000,000 board feet. Each holding is grouped according to its total in the Lake States. See page 94 for description of the groups. The number of holdings in each group is shown in italics.]

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Lake States.....	100.0	......	......	.....	*2* 8.8	.....	*7* 8.2	*21* 15.0	*39* 13.9	*69* 12.2	*81* 7.0	*219* 65.1	34.9
Michigan..............	47.6	......	......	.....	4.9	.....	3.2	6.9	6.2	6.7	3.3	31.2	16.4
Wisconsin.............	29.2	......	......	.....	.....	.....	3.0	5.8	6.0	4.6	2.6	22.0	7.2
Minnesota.............	23.2	......	......	.....	3.9	.....	2.0	2.3	1.7	.9	1.1	11.9	11.3

Section 6. Concentration by size groups and by species.

The distribution by groups as shown in Tables 20, 21, and 22 does not reveal the full extent of concentration. This is better developed by figures for species. Table 26 classifies the timber shown in Table 20 by species, the size grouping also being shown. In some of the Southern States scattered amounts of cypress have no doubt been included in the estimates for hardwoods instead of being separately reported, and similarly the estimates for the minor species in the Pacific-Northwest are somewhat less accurate than the estimates for total timber. This does not involve any error for the other species. In this and the following tables entries showing a small amount, as a few tenths of a billion feet, for a particular species and a particular group in a State, may be considerably in error; but where the amount of timber shown by a given entry is relatively large, the element of error is not material.

TABLE 26.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA, CLASSIFIED BY SIZE AND BY SPECIES.

[In billions of board feet. Thus, 338.9=338,900,000,000 board feet. Each holding is grouped according to its total in the investigation area. See p. 94 for description of the groups, and p. 105 for explanation of the figures in italics.]

PACIFIC-NORTHWEST.

Total for 5 States.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	1,013.0	*8* 338.9		*12* 97.4	*18* 71.0	*26* 64.6	*67* 91.9	*86* 59.2	*96* 34.3	*176* 31.8	*222* 18.3	*711* 807.4	205.6
Douglas fir	521.9	182.3		40.5	35.9	34.3	45.1	29.6	18.5	18.2	10.2	414.6	107.3
White pine	19.6	2.8		9.2	.5	.9	1.2	.2	.8	.5	.1	16.2	3.4
Western pine	153.4	55.1		14.8	6.1	3.8	13.3	8.4	3.9	3.0	1.9	110.3	43.1
Sugar pine	34.7	15.5		1.0	1.5	1.1	3.5	2.7	1.0	.4	.6	27.3	7.4
Redwood	101.9	20.6		17.8	16.6	14.0	14.6	4.3	2.7	2.9	1.5	95.0	6.9
Cedar	56.7	18.1		3.8	3.5	3.6	4.4	4.6	2.8	3.0	1.5	45.3	11.4
Hemlock	57.4	23.7		2.6	3.8	2.9	4.7	3.8	2.0	2.1	1.2	46.8	10.6
Spruce	21.9	6.4		.4	1.7	1.8	1.9	2.3	1.1	.7	.5	16.8	5.1
All other species	45.5	14.4		7.3	1.4	2.2	3.2	3.3	1.5	1.0	.8	35.1	10.4
California.													
Total	248.1	84.2		24.9	27.5	21.2	26.4	12.4	5.2	4.2	3.3	209.3	38.8
Douglas fir	45.2	18.4		2.6	5.9	3.1	2.4	1.0	.7	.4	.3	34.8	10.4
Western pine	61.2	30.7		2.7	3.3	1.7	4.3	2.9	.7	.6	.9	47.8	13.4
Sugar pine	23.8	9.3		.9	1.3	1.1	2.9	2.1	.6	.2	.4	18.8	5.0
Redwood	101.9	20.6		17.8	16.6	14.0	14.6	4.3	2.7	2.9	1.5	95.0	6.9
Cedar	3.4	.8		.3	.4	.4	.2	.3	.1	.....	.....	2.5	.9
Spruce	1.2	.1		.2	.....	.1	.3	.1	.1	.....	.1	1.0	.2
All other species	11.4	4.3		.4	.....	.8	1.7	1.7	.3	.1	.1	9.4	2.0
Oregon.													
Total	398.1	89.2	34.6	33.3	26.7	24.4	39.9	23.3	13.7	12.7	7.6	305.4	92.7
Douglas fir	273.5	54.4	29.2	25.0	21.8	19.3	26.8	14.7	9.3	9.1	5.2	214.8	58.7
White pine	.2	.....	.....	.....	.....	.....	.....	.....	.....	.1	.....	.1	.1
Western pine	58.5	16.1	1.0	4.0	2.1	1.5	7.3	3.3	2.1	1.3	.9	39.6	18.9
Sugar pine	10.9	6.0	.2	.1	.2	.....	.6	.6	.4	.2	.2	8.5	2.4
Cedar	12.6	4.1	.8	.9	.6	.8	.8	.5	.4	.8	.3	10.0	2.6
Hemlock	23.9	6.3	1.9	1.9	1.0	1.1	2.9	1.9	.9	.8	.6	19.3	4.6
Spruce	10.1	1.3	.8	.....	.8	1.1	.7	1.5	.5	.2	.2	7.1	3.0
All other species	8.4	1.0	.7	1.4	.2	.6	.8	.8	.1	.2	.2	6.0	2.4

TABLE 26.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA, CLASSIFIED BY SIZE AND BY SPECIES—Continued.

PACIFIC-NORTHWEST—Continued.

Washington.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	294.6	102.1	14.8	11.8	14.1	16.8	22.9	21.8	12.3	13.8	6.8	237.2	57.4
Douglas fir	193.6	71.4	6.2	9.8	7.7	11.8	15.6	13.7	8.1	8.6	4.5	157.4	36.2
White pine	.7	.2	.....	.....	.....	.....	.2	.....	.....	.1	.....	.5	.2
Western pine	12.5	4.6	.....	.....	.1	.3	.9	1.2	.3	.8	.1	8.3	4.2
Cedar	37.0	9.9	1.7	1.4	2.5	2.1	3.2	3.8	2.1	2.1	1.2	30.0	7.0
Hemlock	33.0	10.2	5.1	.5	2.8	1.8	1.8	1.9	1.1	1.2	.6	27.0	6.0
Spruce	8.9	2.3	.9	.1	.8	.5	.9	.7	.5	.5	.2	7.4	1.5
All other species	8.9	3.5	.9	.....	.2	.3	.3	.5	.2	.5	.2	6.6	2.3

Idaho.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	50.4	4.5	3.0	19.1	1.0	2.0	2.7	1.6	2.3	1.1	.3	37.6	12.8
Douglas fir	5.1	.7	.4	1.5	.1	.1	.3	.2	.2	.1	.1	3.7	1.4
White pine	18.4	1.3	1.3	9.0	.5	.9	1.0	.2	.8	.3	.1	15.4	3.0
Western pine	13.3	.4	.2	4.8	.1	.2	.8	.9	.6	.3	.....	8.3	5.0
Cedar	3.5	.6	.2	1.0	.....	.3	.2	.....	.2	.1	.....	2.6	.9
Hemlock	.5	.2	.....	.2	.....	.....	.....	.....	.....	.1	.....	.5	.....
Spruce	.5	.1	.....	.1	.....	.1	.....	.....	.....	.....	.....	.3	.2
All other species	9.1	1.2	.9	2.5	.3	.4	.4	.3	.5	.2	.1	6.8	2.3

Montana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	21.8	6.5	.....	8.3	1.7	.2	.....	.1	.8	.....	.3	17.9	3.9
Douglas fir	4.5	1.6	.....	1.6	.4	.....	.....	.....	.2	.....	.1	3.9	.6
White pine	.3	.....	.....	.2	.....	.....	.....	.....	.....	.....	.....	.2	.1
Western pine	7.9	2.1	.....	3.3	.5	.1	.....	.1	.2	.....	.....	6.3	1.6
Cedar	.2	.....	.....	.2	.....	.....	.....	.....	.....	.....	.....	.2	.....
Spruce	1.2	.9	.....	.....	.1	.....	.....	.....	.....	.....	.....	1.0	.2
All other species	7.7	1.9	.....	3.0	.7	.1	.....	.....	.4	.....	.2	6.3	1.4

SOUTHERN PINE REGION.

Total for 11 States.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
				3	*8*	*18*	*38*	*92*	*148*	*251*	*367*	*925*	
Total	634.0	.....	.....	22.1	32.7	47.9	50.2	58.7	51.3	42.0	31.4	336.3	297.7
Yellow pine	384.4	.....	.....	21.5	27.9	35.8	33.3	41.4	34.4	26.3	18.5	239.1	145.3
Longleaf	232.3	.....	.....	21.0	19.6	21.1	28.7	26.8	22.4	17.4	11.9	168.9	63.4
Shortleaf and loblolly	152.1	.....	.....	.5	8.3	14.7	4.6	14.6	12.0	8.9	6.6	70.2	81.9
Cypress	40.4	.....	.....	.....	1.3	5.5	5.0	7.0	4.6	3.7	2.1	29.2	11.2
Hardwoods	209.2	.....	.....	.6	3.5	6.6	11.9	10.3	12.3	12.0	10.8	68.0	141.2

TABLE 26.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA, CLASSIFIED BY SIZE AND BY SPECIES—Continued.

SOUTHERN PINE REGION—Continued.

Missouri (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	9.9	.....	.....	.....	.....	.3	1.2	1.7	.4	.9	.7	5.2	4.7
Yellow pine	1.1	.....	.....	.....	.....	.2	.....	.4	.....	.1	.....	.7	.4
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	1.1	.....	.....	.....	.....	.2	.....	.4	.....	.1	.....	.7	.4
Cypress	.9	.....	.....	.....	.....	.....	.....	.2	.2	.1	.1	.6	.3
Hardwoods	7.9	.....	.....	.....	.....	.1	1.2	1.1	.2	.7	.6	3.9	4.0

Arkansas.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	78.7	.....	.....	.....	2.9	3.5	6.1	8.3	7.8	5.2	4.1	37.9	40.8
Yellow pine	26.0	.....	.....	.....	2.5	1.6	1.2	5.6	3.1	1.3	.9	16.2	9.8
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	26.0	.....	.....	.....	2.5	1.6	1.2	5.6	3.1	1.3	.9	16.2	9.8
Cypress	2.2	.....	.....	.....	.....	.....	.1	.1	.3	.1	.1	.7	1.5
Hardwoods	50.5	.....	.....	.....	.4	1.9	4.8	2.6	4.4	3.8	3.1	21.0	29.5

Texas.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	66.0	.....	.....	11.2	3.6	6.0	.6	4.9	4.2	3.3	2.7	36.5	29.5
Yellow pine	44.9	.....	.....	10.8	3.6	5.6	.6	4.3	3.4	2.5	1.6	32.4	12.5
Longleaf	22.4	.....	.....	10.3	2.4	1.9	.1	2.5	.9	.6	.7	19.4	3.0
Shortleaf and loblolly	22.5	.....	.....	.5	1.2	3.7	.5	1.8	2.5	1.9	.9	13.0	9.5
Cypress	.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.2
Hardwoods	20.9	.....	.....	.4	.....	.4	.....	.6	.8	.8	1.1	4.1	16.8

Louisiana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	119.8	.....	.....	3.7	15.2	14.8	15.8	11.4	9.4	7.5	5.0	82.8	37.0
Yellow pine	67.7	.....	.....	3.6	13.8	10.7	12.1	5.3	4.2	3.4	2.1	55.2	12.5
Longleaf	52.5	.....	.....	3.6	11.2	7.4	10.9	4.6	3.1	2.3	1.2	44.3	8.2
Shortleaf and loblolly	15.2	.....	.....	.....	2.6	3.3	1.2	.7	1.1	1.1	.9	10.9	4.3
Cypress	15.7	.....	.....	.....	.8	2.9	.6	3.6	2.1	1.2	.9	12.1	3.6
Hardwoods	36.4	.....	.....	.1	.6	1.2	3.1	2.5	3.1	2.9	2.0	15.5	20.9

TABLE 26.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA, CLASSIFIED BY SIZE AND BY SPECIES—Continued.

SOUTHERN PINE REGION—Continued.

Mississippi.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	95.3	.....	.....	6.5	4.3	7.9	7.7	4.6	7.2	5.5	4.1	47.8	47.5
Yellow pine	62.4	.....	.....	6.5	4.3	5.3	6.9	4.0	5.9	4.0	2.3	39.2	23.2
Longleaf	47.6	.....	.....	6.5	4.3	3.3	6.8	3.7	4.8	3.4	1.9	34.7	12.9
Shortleaf and loblolly	14.8	.....	.....	.....	.....	2.0	.1	.3	1.1	.6	.4	4.5	10.3
Cypress	1.9	.....	.....	.....	.....	.5	.....	.....	.1	.3	.1	1.0	.9
Hardwoods	31.0	.....	.....	.....	.....	2.1	.8	.6	1.2	1.2	1.7	7.6	23.4

Alabama.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	56.3	.....	.....	.....	1.0	.9	2.6	7.4	3.6	3.8	2.4	21.7	34.6
Yellow pine	38.0	.....	.....	.....	1.0	.9	2.2	6.5	3.1	2.8	1.8	18.3	19.7
Longleaf	25.6	.....	.....	.....	1.0	.7	2.0	5.4	3.0	2.2	1.3	15.6	10.0
Shortleaf and loblolly	12.4	.....	.....	.....	.....	.2	.2	1.1	.1	.6	.5	2.7	9.7
Cypress	.2	.....	.....	.....	.....	.....	.....	.....	.....	.1	.....	.1	.1
Hardwoods	18.1	.....	.....	.....	.....	.....	.4	.9	.5	.9	.6	3.3	14.8

Florida.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	73.9	.....	.....	.6	.7	7.4	11.9	13.6	10.0	8.4	5.6	58.2	15.7
Yellow pine	59.1	.....	.....	.6	.7	6.2	8.8	10.4	8.2	7.3	5.1	47.3	11.8
Longleaf	58.2	.....	.....	.6	.7	6.2	8.8	10.3	8.1	7.3	5.1	47.1	11.1
Shortleaf and loblolly	.9	.....	.....	.....	.....	.....	.....	.1	.1	.....	.....	.2	.7
Cypress	10.7	.....	.....	.....	.....	1.2	2.6	2.7	1.4	1.0	.4	9.3	1.4
Hardwoods	4.1	.....	.....	.....	.....	.....	.5	.5	.4	.1	.1	1.6	2.5

Georgia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	46.0	.....	.....	.....	.....	2.2	1.1	.2	3.2	1.9	2.3	10.9	35.1
Yellow pine	31.7	.....	.....	.....	.....	1.1	.1	.2	2.3	1.3	1.8	6.8	24.9
Longleaf	18.5	.....	.....	.....	.....	1.1	.1	.2	2.1	1.3	1.4	6.2	12.3
Shortleaf and loblolly	13.2	.....	.....	.....	.....	.....	.....	.....	.2	.....	.4	.6	12.6
Cypress	2.8	.....	.....	.....	.....	.6	.9	.....	.3	.3	.2	2.3	.5
Hardwoods	11.5	.....	.....	.....	.....	.5	.1	.....	.6	.3	.3	1.8	9.7

TABLE 26.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA, CLASSIFIED BY SIZE AND BY SPECIES—Continued.

SOUTHERN PINE REGION—Continued.

South Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	30.7	.....	.....	.1	.....	3.3	.4	3.1	2.0	2.2	2.1	13.2	17.5
Yellow pine	19.2	.....	.....	.....	.....	2.7	.4	1.8	1.7	1.1	1.1	8.8	10.4
Longleaf	4.6	.....	.....	.....	.....	.5	.....	.1	.3	.2	.2	1.3	3.3
Shortleaf and loblolly	14.6	.....	.....	.....	.....	2.2	.4	1.7	1.4	.9	.9	7.5	7.1
Cypress	2.6	.....	.....	.....	.....	.3	.....	.3	.1	.5	.3	1.5	1.1
Hardwoods	8.9	.....	.....	.1	.....	.3	.....	1.0	.2	.6	.7	2.9	6.0

North Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	42.9	.....	.....	.....	4.9	.3	2.4	2.9	3.2	3.0	1.7	18.4	24.5
Yellow pine	25.6	.....	.....	.....	2.0	.3	.9	2.4	2.3	2.3	1.3	11.5	14.1
Longleaf	2.9	.....	.....	.....	.....	.....	.....	.....	.1	.1	.1	.3	2.6
Shortleaf and loblolly	22.7	.....	.....	.....	2.0	.3	.9	2.4	2.2	2.2	1.2	11.2	11.5
Cyprèss	3.0	.....	.....	.....	.5	.....	.7	.1	.1	.1	.....	1.5	1.5
Hardwoods	14.3	.....	.....	.....	2.4	.....	.8	.4	.8	.6	.4	5.4	8.9

Virginia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	14.5	.....	.....	.....	.1	1.3	.4	.6	.3	.3	.7	3.7	10.8
Yellow pine	8.7	.....	.....	.....	.....	1.2	.1	.5	.2	.2	.5	2.7	6.0
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	8.7	.....	.....	.....	.....	1.2	.1	.5	.2	.2	.5	2.7	6.0
Cypress	.2	.....	.....	.....	.....	.....	.1	.....	.....	.....	.....	.1	.1
Hardwoods	5.6	.....	.....	.....	.1	.1	.2	.1	.1	.1	.2	.9	4.7

LAKE STATES.

Total for 3 States.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
					4	*6*	*7*	*27*	*34*	*69*	*68*	*215*	
Total	100.0	.....	.6	.....	11.6	3.7	7.1	14.5	10.8	11.0	5.8	65.1	34.9
White and Norway pine	17.7	.....	.5	.....	4.5	.4	1.8	3.4	1.2	1.3	1.0	14.1	3.6
Hemlock	26.6	.....	.1	.....	1.7	1.4	1.4	4.4	4.5	4.3	2.0	19.8	6.8
Other conifers	13.8	.....	.....	.....	1.6	.2	.7	.9	.6	.8	.7	5.5	8.3
Hardwoods	41.9	.....	.....	.....	3.8	1.7	3.2	5.8	4.5	4.6	2.1	25.7	16.2

TABLE 26.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA, CLASSIFIED BY SIZE AND BY SPECIES—Continued.

LAKE STATES—Continued.

Michigan.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	47.6	.....	.2	.....	6.0	1.6	3.4	6.4	5.0	5.8	2.8	31.2	16.4
White and Norway pine	2.0	.....	.1	.....	.2	.....	.3	.4	.1	.3	.2	1.6	.4
Hemlock	15.0	.....	.1	.....	1.4	.5	.8	2.0	2.1	2.3	1.1	10.3	4.7
Other conifers	5.2	.....	.....	.....	.8	.1	.3	.3	.2	.5	.3	2.5	2.7
Hardwoods	25.4	.....	.....	.....	3.6	1.0	2.0	3.7	2.6	2.7	1.2	16.8	8.6

Wisconsin.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	29.2	.....	.....	.....	.6	2.1	2.0	5.9	4.8	4.4	2.2	22.0	7.2
White and Norway pine	3.2	.....	.....	.....	.1	.4	.2	1.2	.2	.5	.2	2.8	.4
Hemlock	11.6	.....	.....	.....	.3	.9	.6	2.4	2.4	2.0	.9	9.5	2.1
Other conifers	2.3	.....	.....	.....	.....	.1	.1	.4	.3	.2	.2	1.3	1.0
Hardwoods	12.1	.....	.....	.....	.2	.7	1.1	1.9	1.9	1.7	.9	8.4	3.7

Minnesota.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	23.2	.....	.4	.....	5.0	.....	1.7	2.2	1.0	.8	.8	11.9	11.3
White and Norway pine	12.5	.....	.4	.....	4.2	.....	1.3	1.8	.9	.5	.6	9.7	2.8
Hemlock	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other conifers	6.3	.....	.....	.....	.8	.....	.3	.2	.1	.1	.2	1.7	4.6
Hardwoods	4.4	.....	.....	.....	.....	.....	.1	.2	.....	.2	.....	.5	3.9

In Table 26 the 35.1 billion owned by the Southern Pacific in California (see Tables 19 and 20) is combined with the 49.0 billion in group 2, and this causes a similar consolidated column in the section of the table for the Pacific-Northwest. The division of the Southern Pacific timber in California by species was somewhat uncertain, and, therefore, it is not shown separately. The total of this holding and group 2 is so large that in its distribution by species, as shown above, no important error is caused by the somewhat uncertain data for the Southern Pacific.

The concentration in ownership by species is particularly important in the Southern Pine Region.

Nearly all the 232 billion feet of longleaf pine in the Southern Pine Region is in the States of Texas, Louisiana, Mississippi, Alabama, Florida, and Georgia, and in all but Georgia the concentration of ownership is remarkably high. A similar or even greater concentration of cypress ownership appears in Louisiana, Florida, and

Georgia, which have 29 billion feet out of 40 billion feet of cypress in the region. The remaining 11 billion feet of cypress is largely in scattered tracts, mixed with cheap hardwoods, and as a result much of it is owned in relatively small lots. There is very high concentration of ownership in the virgin stands of shortleaf and loblolly pine in Arkansas, Texas, and Louisiana. In Mississippi and Alabama the bulk of the shortleaf and loblolly pine is in lighter and more scattered stands than longleaf, and it is less valuable. As compared with the States to the west the yellow pine in Georgia, South Carolina, North Carolina, and Virginia has offered much less profit to large investors, partly because it has been culled over since before the civil war, so that the present stand is more scattered and largely of younger growth; and partly because the development of the lumber industry in these States had given the timber a relatively high value before large capitalists were attracted to timber investments. There are a few very large holders in these States, but the bulk of the timber is in much smaller holdings than in the Gulf States.

A very large proportion of the hardwoods of the Southern Pine Region was regarded until recent years as only an incumbrance on the land. Consequently the large investors passed them by for the species promising a rapid increase in value. Of the 209 billion feet of hardwoods in the Southern Pine Region 141 billion, or 67.5 per cent, is in group 11. The percentage in group 11 for the States separately ranges from 50 in Missouri to 84 in Georgia and Virginia. In figures on total timber in the Southern Pine Region the relatively low concentration in the hardwoods of all the States; in the yellow pine of Virginia, North Carolina, South Carolina, and Georgia, and in the shortleaf and loblolly pine of Alabama and Mississippi, conceals the exceedingly high concentration in those forest areas which have offered great profit to large investors through their very rapid increase in value.

Table 27, derived from Table 26, shows the percentage of each species, in each geographic division and in each State, that is owned by each group. Thus, 34.9 per cent of the Douglas fir and 44.6 per cent of the sugar pine in the Pacific-Northwest is owned by holders in groups 1 and 2. The same groups own 50.2 per cent of the western pine in California. Group 1 owns 19.9 per cent of the Douglas fir in Oregon and 36.9 per cent of the Douglas fir in Washington.

TABLE 27.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF EACH SPECIES BY SIZE GROUPS, IN PERCENTAGES.

[Percentages computed from Table 26. See note at head of Table 26.]

PACIFIC-NORTHWEST.

Total for 5 States.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
		8		*12*	*18*	*26*	*67*	*86*	*96*	*176*	*222*	*711*	
Total	100.0	33.5		9.6	7.0	6.4	9.1	5.8	3.4	3.1	1.8	79.7	20.3
Douglas fir	100.0	34.9		7.8	6.9	6.6	8.6	5.7	3.5	3.5	1.9	79.4	20.6
White pine	100.0	14.3		46.9	2.6	4.6	6.1	1.0	4.1	2.6	.5	82.7	17.3
Western pine	100.0	35.9		9.6	4.0	2.5	8.7	5.5	2.5	2.0	1.2	71.9	28.1
Sugar pine	100.0	44.6		2.9	4.3	3.2	10.1	7.8	2.9	1.2	1.7	78.7	21.3
Redwood	100.0	20.2		17.5	16.3	13.7	14.3	4.2	2.7	2.8	1.5	93.2	6.8
Cedar	100.0	31.9		6.7	6.2	6.4	7.8	8.1	4.9	5.3	2.6	79.9	20.1
Hemlock	100.0	41.3		4.5	6.6	5.0	8.2	6.6	3.5	3.7	2.1	81.5	18.5
Spruce	100.0	29.2		1.8	7.8	8.2	8.7	10.5	5.0	3.2	2.3	76.7	23.3
All other species	100.0	31.6		16.0	3.1	4.8	7.0	7.3	3.3	2.2	1.8	77.1	22.9
California.													
Total	100.0	34.0		10.0	11.1	8.6	10.6	5.0	2.1	1.7	1.3	84.4	15.6
Douglas fir	100.0	40.7		5.7	13.1	6.9	5.3	2.2	1.5	.9	.7	77.0	23.0
Western pine	100.0	50.2		4.4	5.4	2.8	7.0	4.7	1.1	1.0	1.5	78.1	21.9
Sugar pine	100.0	39.1		3.8	5.5	4.6	12.2	8.8	2.5	.8	1.7	79.0	21.0
Redwood	100.0	20.2		17.5	16.3	13.7	14.3	4.2	2.7	2.8	1.5	93.2	6.8
Cedar	100.0	23.5		8.8	11.8	11.8	5.9	8.8	2.9	.....	.....	73.5	26.5
Spruce All other species	100.0	34.9		4.8	.....	7.1	15.9	14.3	3.2	.8	1.6	82.6	17.4
Oregon.													
Total	100.0	22.4	8.7	8.4	6.7	6.1	10.0	5.9	3.4	3.2	1.9	76.7	23.3
Douglas fir	100.0	19.9	10.7	9.1	8.0	7.0	9.8	5.4	3.4	3.3	1.9	78.5	21.5
White pine Western pine	100.0	27.4	1.7	6.8	3.6	2.6	12.4	5.6	3.6	2.4	1.5	67.6	32.4
Sugar pine	100.0	55.1	1.8	.9	1.9	.....	5.5	5.5	3.7	1.8	1.8	78.0	22.0
Cedar	100.0	32.5	6.4	7.1	4.8	6.3	6.3	4.0	3.2	6.4	2.4	79.4	20.6
Hemlock	100.0	26.4	8.0	8.0	4.2	4.6	12.1	7.9	3.8	3.3	2.5	80.8	19.2
Spruce	100.0	12.9	7.9	.....	7.9	10.9	6.9	14.9	4.9	2.0	2.0	70.3	29.7
All other species	100.0	11.9	8.3	16.7	2.4	7.1	9.5	9.5	1.2	2.4	2.4	71.4	28.6
Washington.													
Total	100.0	34.6	5.0	4.0	4.8	5.7	7.8	7.4	4.2	4.7	2.3	80.5	19.5
Douglas fir	100.0	36.9	3.2	5.1	4.0	6.1	8.0	7.1	4.2	4.4	2.3	81.3	18.7
White pine Western pine	100.0	36.4	.....	.....	.8	2.3	8.3	9.1	2.3	6.8	.7	66.7	33.3
Cedar	100.0	26.8	4.6	3.8	6.7	5.7	8.6	10.3	5.7	5.7	3.2	81.1	18.9
Hemlock	100.0	30.9	15.5	1.5	8.5	5.4	5.5	5.8	3.3	3.6	1.8	81.8	18.2
Spruce	100.0	25.8	10.1	1.1	9.0	5.6	10.1	7.9	5.6	5.6	2.3	83.1	16.9
All other species	100.0	39.3	10.1	.....	2.3	3.4	3.4	5.6	2.3	5.6	2.2	74.2	25.8

TABLE 27.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF EACH SPECIES BY SIZE GROUPS, IN PERCENTAGES—Continued.

PACIFIC-NORTHWEST—Continued.

Idaho.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	8.9	5.9	37.9	2.0	4.0	5.3	3.2	4.6	2.2	.6	74.6	25.4
Douglas fir	100.0	13.7	7.8	29.4	2.0	2.0	5.9	3.9	3.9	2.0	2.0	72.6	27.4
White pine	100.0	7.1	7.1	48.9	2.7	4.9	5.4	1.1	4.4	1.6	.5	83.7	16.3
Western pine	100.0	3.0	1.5	36.1	.7	1.5	6.0	6.8	4.5	2.3	.....	62.4	37.6
Cedar	100.0	17.1	5.7	28.6	.....	8.6	5.7	.....	5.7	2.9	.....	74.3	25.7
Hemlock Spruce All other species	100.0	14.8	8.9	27.7	3.0	4.9	4.0	3.0	4.9	3.0	1.0	75.2	24.8

Montana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	29.8	.....	38.1	7.8	.9	.....	.4	3.7	.....	1.4	82.1	17.9
Douglas fir	100.0	35.6	.....	35.6	8.9	.....	.....	.....	4.4	.....	2.2	86.7	13.3
White pine Western pine	100.0	25.6	.....	42.7	6.1	1.2	.....	1.2	2.5	.....	.....	79.3	20.7
Cedar Spruce All other species	100.0	30.8	.....	35.1	8.8	1.1	.....	.....	4.4	.....	2.2	82.4	17.6

SOUTHERN PINE REGION.

Total for 11 States.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
				3	*8*	*18*	*38*	*92*	*148*	*251*	*367*	*925*	
Total	100.0	.....	.....	3.5	5.2	7.5	7.9	9.3	8.1	6.6	4.9	53.0	47.0
Yellow pine	100.0	.....	.....	5.6	7.3	9.3	8.7	10.8	8.9	6.8	4.8	62.2	37.8
Longleaf	100.0	.....	.....	9.0	8.4	9.1	12.4	11.5	9.7	7.5	5.1	72.7	27.3
Shortleaf and loblolly	100.0	.....	.....	.3	5.5	9.7	3.0	9.6	7.9	5.9	4.3	46.2	53.8
Cypress	100.0	.....	.....	.....	3.2	13.6	12.4	17.3	11.4	9.2	5.2	72.3	27.7
Hardwoods	100.0	.....	.....	.3	1.7	3.1	5.7	4.9	5.9	5.7	5.2	32.5	67.5

Missouri (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	.....	3.0	12.1	17.2	4.0	9.1	7.1	52.5	47.5
Yellow pine	100.0	.....	.....	.....	.....	18.2	.....	36.3	.....	9.1	.....	63.6	36.4
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	100.0	.....	.....	.....	.....	18.2	.....	36.3	.....	9.1	.....	63.6	36.4
Cypress	100.0	.....	.....	.....	.....	.....	.....	22.2	22.2	11.1	11.1	66.6	33.4
Hardwoods	100.0	.....	.....	.....	.....	1.3	15.2	13.9	2.5	8.9	7.6	49.4	50.6

TABLE 27.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF EACH SPECIES BY SIZE GROUPS, IN PERCENTAGES—Continued.

SOUTHERN PINE REGION—Continued.

Arkansas.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.....	3.7	4.5	7.8	10.5	9.9	6.6	5.2	48.2	51.8
Yellow pine	100.0	.....	.....	.....	9.6	6.2	4.6	21.5	11.9	5.0	3.5	62.3	37.7
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	100.0	.....	.....	.....	9.6	6.2	4.6	21.5	11.9	5.0	3.5	62.3	37.7
Cypress	100.0	.....	.....	.....	.....	.....	4.5	4.5	13.6	4.6	4.6	31.8	68.2
Hardwoods	100.0	.....	.....	.....	.8	3.8	9.5	5.2	8.7	7.5	6.1	41.6	58.4

Texas.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	17.0	5.4	9.1	.9	7.4	6.4	5.0	4.1	55.3	44.7
Yellow pine	100.0	.....	.....	24.0	8.0	12.5	1.3	9.6	7.6	5.6	3.6	72.2	27.8
Longleaf	100.0	.....	.....	46.0	10.7	8.5	.4	11.2	4.0	2.7	3.1	86.6	13.4
Shortleaf and loblolly	100.0	.....	.....	2.2	5.3	16.5	2.2	8.0	11.1	8.5	4.0	57.8	42.2
Cypress	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100.0
Hardwoods	100.0	.....	.....	1.9	.....	1.9	.....	2.9	3.8	3.8	5.3	19.6	80.4

Louisiana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	3.1	12.7	12.3	13.2	9.5	7.8	6.3	4.2	69.1	30.9
Yellow pine	100.0	.....	.....	5.3	20.4	15.8	17.9	7.8	6.2	5.0	3.1	81.5	18.5
Longleaf	100.0	.....	.....	6.8	21.3	14.1	20.8	8.8	5.9	4.4	2.3	84.4	15.6
Shortleaf and loblolly	100.0	.....	.....	.....	17.1	21.7	7.9	4.6	7.2	7.3	5.9	71.7	28.3
Cypress	100.0	.....	.....	.....	5.1	18.5	3.8	22.9	13.4	7.7	5.7	77.1	22.9
Hardwoods	100.0	.....	.....	.3	1.6	3.3	8.5	6.9	8.5	8.0	5.5	42.6	57.4

Mississippi.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	6.8	4.5	8.3	8.1	4.8	7.6	5.8	4.3	50.2	49.8
Yellow pine	100.0	.....	.....	10.4	6.9	8.5	11.1	6.4	9.4	6.4	3.7	62.8	37.2
Longleaf	100.0	.....	.....	13.7	9.0	6.9	14.3	7.8	10.1	7.1	4.0	72.9	27.1
Shortleaf and loblolly	100.0	.....	.....	.....	.....	13.5	.7	2.0	7.4	4.1	2.7	30.4	69.6
Cypress	100.0	.....	.....	.....	.....	26.3	.....	.....	5.2	15.8	5.3	52.6	47.4
Hardwoods	100.0	.....	.....	.....	.....	6.8	2.6	1.9	3.9	3.8	5.5	24.5	75.5

TABLE 27.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF EACH SPECIES BY SIZE GROUPS, IN PERCENTAGES—Continued.

SOUTHERN PINE REGION—Continued.

Alabama.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.....	1.8	1.6	4.6	13.1	6.4	6.7	4.3	38.5	61.5
Yellow pine	100.0	.....	.....	.....	2.6	2.4	5.8	17.1	8.2	7.4	4.7	48.2	51.8
Longleaf	100.0	.....	.....	.....	3.9	2.7	7.8	21.1	11.7	8.6	5.1	60.9	39.1
Shortleaf and loblolly	100.0	.....	.....	.....	.....	1.6	1.6	8.9	.8	4.9	4.0	21.8	78.2
Cypress	100.0	.....	.....	.....	.....	.....	.....	.....	.....	50.0	.....	50.0	50.0
Hardwoods	100.0	.....	.....	.....	.....	.....	2.2	5.0	2.7	5.0	3.3	18.2	81.8

Florida.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.8	1.0	10.0	16.1	18.4	13.5	11.4	7.6	78.8	21.2
Yellow pine	100.0	.....	.....	1.0	1.2	10.5	14.9	17.6	13.9	12.3	8.6	80.0	20.0
Longleaf	100.0	.....	.....	1.0	1.2	10.7	15.1	17.7	13.9	12.5	8.8	80.9	19.1
Shortleaf and loblolly	100.0	.....	.....	.....	.....	.....	.....	11.1	11.1	.....	.....	22.2	77.8
Cypress	100.0	.....	.....	.....	.....	11.2	24.3	25.2	13.1	9.4	3.7	86.9	13.1
Hardwoods	100.0	.....	.....	.....	.....	.....	12.2	12.2	9.8	2.4	2.4	39.0	61.0

Georgia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.....	.....	4.8	2.4	.4	7.0	4.1	5.0	23.7	76.3
Yellow pine	100.0	.....	.....	.....	.....	3.5	.3	.6	7.3	4.1	5.7	21.5	78.5
Longleaf	100.0	.....	.....	.....	.....	5.9	.5	1.1	11.4	7.0	7.6	33.5	66.5
Shortleaf and loblolly	100.0	.....	.....	.....	.....	.....	.....	.....	1.5	.....	3.0	4.5	95.5
Cypress	100.0	.....	.....	.....	.....	21.4	32.1	.....	10.7	10.7	7.2	82.1	17.9
Hardwoods	100.0	.....	.....	.....	.....	4.4	.9	.....	5.2	2.6	2.6	15.7	84.3

South Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.3	.....	10.8	1.3	10.1	6.5	7.2	6.8	43.0	57.0
Yellow pine	100.0	.....	.....	.....	.....	14.1	2.1	9.4	8.8	5.7	5.7	45.8	54.2
Longleaf	100.0	.....	.....	.....	.....	10.9	.....	2.2	6.5	4.4	4.3	28.3	71.7
Shortleaf and loblolly	100.0	.....	.....	.....	.....	15.1	2.7	11.6	9.6	6.2	6.2	51.4	48.6
Cypress	100.0	.....	.....	.....	.....	11.6	.....	11.5	3.9	19.2	11.5	57.7	42.3
Hardwoods	100.0	.....	.....	1.1	.....	3.4	.....	11.2	2.3	6.7	7.9	32.6	67.4

TABLE 27.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF EACH SPECIES BY SIZE GROUPS, IN PERCENTAGES—Continued.

SOUTHERN PINE REGION—Continued.

North Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.....	11.4	.7	5.6	6.7	7.5	7.0	4.0	42.9	57.1
Yellow pine	100.0	.....	.....	.....	7.8	1.1	3.5	9.4	9.0	9.0	5.1	44.9	55.1
Longleaf	100.0	.....	.....	.....	.....	.....	.....	.....	3.5	3.4	3.4	10.3	89.7
Shortleaf and loblolly	100.0	.....	.....	.....	8.8	1.3	4.0	10.6	9.7	9.7	5.3	49.4	50.6
Cypress	100.0	.....	.....	.....	16.7	.....	23.3	3.3	3.3	3.4	.....	50.0	50.0
Hardwoods	100.0	.....	.....	.....	16.8	.....	5.6	2.8	5.6	4.2	2.8	37.8	62.2

Virginia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.....	.7	9.0	2.7	4.1	2.1	2.1	4.8	25.5	74.5
Yellow pine	100.0	.....	.....	.....	.....	13.8	1.2	5.7	2.3	2.3	5.7	31.0	69.0
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	100.0	.....	.....	.....	.....	13.8	1.2	5.7	2.3	2.3	5.7	31.0	69.0
Cypress	100.0	.....	.....	.....	.....	.....	50.0	.....	.....	.....	.....	50.0	50.0
Hardwoods	100.0	.....	.....	.....	1.8	1.8	3.6	1.8	1.8	1.8	3.5	16.1	83.9

LAKE STATES.

Total for 3 States.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.6	.....	*4* 11.6	*6* 3.7	*7* 7.1	*27* 14.5	*34* 10.8	*69* 11.0	*68* 5.8	*215* 65.1	34.9
White and Norway pine	100.0	.....	2.8	.....	25.4	2.3	10.2	19.2	6.8	7.3	5.7	79.7	20.3
Hemlock	100.0	.....	.4	.....	6.4	5.3	5.2	16.5	16.9	16.2	7.5	74.4	25.6
Other conifers	100.0	.....	.....	.....	11.6	1.5	5.1	6.5	4.3	5.8	5.1	39.9	60.1
Hardwoods	100.0	.....	.....	.....	9.1	4.1	7.6	13.8	10.7	11.0	5.0	61.3	38.7

Michigan.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.4	.....	12.6	3.4	7.1	13.4	10.5	12.2	5.9	65.5	34.5
White and Norway pine	100.0	.....	5.0	.....	10.0	.....	15.0	20.0	5.0	15.0	10.0	80.0	20.0
Hemlock	100.0	.....	.7	.....	9.4	3.4	5.3	13.3	14.0	15.3	7.3	68.7	31.3
Other conifers	100.0	.....	.....	.....	15.4	1.9	5.8	5.8	3.8	9.6	5.8	48.1	51.9
Hardwoods	100.0	.....	.....	.....	14.2	3.9	7.9	14.6	10.2	10.6	4.7	66.1	33.9

TABLE 27.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF EACH SPECIES BY SIZE GROUPS, IN PERCENTAGES—Continued.

LAKE STATES—Continued.

Wisconsin.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	2.1	7.2	6.8	20.2	16.4	15.1	7.5	75.3	24.7
White and Norway pine	100.0	.....	.....	.....	3.1	12.5	6.2	37.5	6.3	15.6	6.3	87.5	12.5
Hemlock	100.0	.....	.....	.....	2.6	7.8	5.2	20.7	20.7	17.2	7.7	81.9	18.1
Other conifers	100.0	.....	.....	.....	.....	4.3	4.4	17.4	13.0	8.7	8.7	56.5	43.5
Hardwoods	100.0	.....	.....	.....	1.7	5.8	9.1	15.7	15.7	14.0	7.4	69.4	30.6

Minnesota.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	1.7	.....	21.6	.....	7.3	9.5	4.3	3.5	3.4	51.3	48.7
White and Norway pine	100.0	.....	3.2	.....	33.6	.....	10.4	14.4	7.2	4.0	4.8	77.6	22.4
Hemlock	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other conifers	100.0	.....	.....	.....	12.7	.....	4.7	3.2	1.6	1.6	3.2	27.0	73.0
Hardwoods	100.0	.....	.....	.....	.....	.....	2.3	4.6	.....	4.5	.....	11.4	88.6

On the Pacific coast there is comparatively little difference between one species and another in respect to their distribution among the groups of holders. This is due to the fact that most of the stand of the less desirable species grows intermixed with the more desirable so that the ownership of one goes with that of the other. Groups 1 and 2, composed of 8 holders, own 33.5 per cent of all the privately owned timber in the Pacific-Northwest, and they own about this proportion of each enumerated species, with two or three exceptions. Of white pine, they have only 14.3 per cent, while group 3 has 46.9 per cent. Of redwood, groups 1 and 2 own 20.2 per cent. Groups 3, 4, 5, and 6 have each a considerable share of this species, ranging from 13.7 per cent of the total for group 5 to 17.5 per cent for group 3. The holders of less than 60 million feet each have only 6.8 per cent of the redwood—far less than of any other species enumerated.

In Arkansas 54 per cent of the shortleaf and loblolly pine is owned in groups 4 to 8. In Texas 46 per cent of the longleaf is owned in group 3, 19 per cent in groups 4 and 5, 11 per cent in group 7, and only 13 per cent in group 11, while 24 per cent of the shortleaf and loblolly pine is owned in groups 3 to 5. Forty-two per cent of all the yellow pine in Louisiana is owned in groups 3 to 5, and those groups together with group 6 contain 60 per cent. Nearly two-thirds of the cypress in Louisiana is in groups 4 to 8. Thirty per cent of the longleaf pine in Mississippi is owned in groups 3 to 5, and 32 per cent in groups 6 to 8. In Alabama 47 per cent of the longleaf is in groups 4 to 8. In Florida 45 per cent of the yellow pine is in groups 3 to 7, and 35 per cent more in groups 8 to 10. Sixty-one per cent of the cypress in Florida is in groups 5 to 7, and 23 per cent in groups 8 and 9.

In connection with this high concentration in the ownership of the longleaf pine in Florida, it may be noted that this tree is the source of turpentine and rosin; and that at present nearly half of the country's output of these commodities comes from Florida.

Section 7. Proportion of species in each size group.

Table 28 below shows the relative preponderance of each species in each group of holdings. This is a table of percentages based on the figures in Table 26 (p. 112). Thus 53.8 per cent of the holdings of groups 1 and 2 in the Pacific-Northwest is Douglas fir. In next to the last column in the table is shown the percentage which each species forms of all the timber owned in the first 10 groups; that is, the groups in which each of the holdings consists of 60 million feet or more. The last column in the table shows the per centages for group 11; that is, those holdings each of which has less than 60 million feet. Thus, these columns show that Douglas fir constitutes 51.3 per cent of the total timber of the first 10 groups and 52.2 per cent of that in group 11; western pine, 13.7 per cent of the total for the first 10 groups and 21 per cent for group 11; redwood, 11.8 per cent and 3.4 per cent, respectively.

TABLE 28.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES.

[Percentages computed from Table 26. See note at head of Table 26.]

PACIFIC-NORTHWEST.

Total for 5 States.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	51.5	53.8		41.6	50.6	53.1	49.1	50.0	53.9	57.2	55.7	51.3	52.2
White pine	1.9	.8		9.4	.7	1.4	1.3	.3	2.3	1.6	.5	2.0	1.6
Western pine	15.1	16.3		15.2	8.6	5.9	14.5	14.2	11.4	9.4	10.4	13.7	21.0
Sugar pine	3.4	4.6		1.0	2.1	1.7	3.8	4.5	2.9	1.3	3.3	3.4	3.6
Redwood	10.1	6.1		18.3	23.4	21.6	15.9	7.3	7.9	9.1	8.2	11.8	3 4
Cedar	5.6	5.3		3.9	4.9	5.6	4.8	7.8	8.2	9.4	8.2	5.6	5.5
Hemlock	5.7	7.0		2.7	5.3	4.5	5.1	6.4	5.8	6.6	6.6	5.8	5.1
Spruce	2.2	1.9		.4	2.4	2.8	2.0	3.9	3.2	2.2	2.7	2.1	2.5
All other species	4.5	4.2		7.5	2.0	3.4	3.5	5.6	4.4	3.2	4.4	4.3	5.1

TABLE 28.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES—Continued.

PACIFIC-NORTHWEST—Continued.

California.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	18.2	21.9		10.4	21.5	14.6	9.1	8.1	13.5	9.5	9.1	16.6	26.8
Western pine	24.6	36.5		10.9	12.0	8.0	16.3	23.4	13.5	14.3	27.3	22.8	34.5
Sugar pine	9.6	11.0		3.6	4.7	5.2	11.0	16.9	11.5	4.8	12.1	9.0	12.9
Redwood	41.1	24.5		71.5	60.4	66.0	55.3	34.7	51.9	69.0	45.5	45.4	17.8
Cedar	1.4	.9		1.2	1.4	1.9	.8	2.4	1.9	.....	.....	1.2	2.3
Spruce	.5	.1		.8	.....	.5	1.1	.8	1.9	.....	3.0	.5	.5
All other species	4.6	5.1		1.6	.....	3.8	6.4	13.7	5.8	2.4	3.0	4.5	5.2
Oregon.													
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	68.7	61.0	84.4	75.1	81.6	79.1	67.2	63.1	67.9	71.6	68.4	70.3	63.3
White pine	.1	.....	.....	.....	.....	.....	.....	.....	.....	.8	.....	(1)	.1
Western pine	14.7	18.0	2.9	12.0	7.9	6.1	18.3	14.2	15.3	10.2	11.9	13.0	20.4
Sugar pine	2.7	6.7	.6	.3	.8	.....	1.5	2.6	2.9	1.6	2.6	2.8	2.6
Cedar	3.2	4.6	2.3	2.7	2.2	3.3	2.0	2.1	2.9	6.3	4.0	3.3	2.8
Hemlock	6.0	7.1	5.5	5.7	3.7	4.5	7.3	8.2	6.6	6.3	7.9	6.3	5.0
Spruce	2.5	1.5	2.3	.....	3.0	4.5	1.7	6.4	3.7	1.6	2.6	2.3	3.2
All other species	2.1	1.1	2.0	4.2	.8	2.5	2.0	3.4	.7	1.6	2.6	2.0	2.6
Washington.													
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	65.7	69.9	41.9	83.1	54.6	70.2	68.1	62.9	65.9	62.3	66.2	66.4	63.1
White pine	.2	.2	.....	.....	.....	.....	.9	.....	.....	.8	.....	.2	.3
Western pine	4.3	4.5	.....	.....	.7	1.8	3.9	5.5	2.4	5.8	1.5	3.5	7.3
Cedar	12.6	9.7	11.5	11.9	17.7	12.5	14.0	17.4	17.1	15.2	17.7	12.6	12.2
Hemlock	11.2	10.0	34.4	4.2	19.9	10.7	7.9	8.7	8.9	8.7	8.8	11.4	10.5
Spruce	3.0	2.3	6.1	.8	5.7	3.0	3.9	3.2	4.1	3.6	2.9	3.1	2.6
All other species	3.0	3.4	6.1	.....	1.4	1.8	1.3	2.3	1.6	3.6	2.9	2.8	4.0
Idaho.													
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	10.1	15.6	13.3	7.9	10.0	5.0	11.1	12.5	8.7	9.1	33.3	9.8	10.9
White pine	36.5	28.9	43.3	47.1	50.0	45.0	37.1	12.5	34.8	27.3	33.4	41.0	23.4
Western pine	26.4	8.9	6.7	25.1	10.0	10.0	29.6	56.2	26.1	27.2	.....	22.1	39.1
Cedar	6.9	13.3	6.7	5.2	.....	15.0	7.4	.....	8.7	9.1	.....	6.9	7.0
Hemlock	1.0	4.4	.....	1.1	.....	.....	.....	.....	.....	9.1	.....	1.3	.....
Spruce	1.0	2.2	.....	.5	.....	5.0	.....	.....	.....	.....	.....	.8	1.6
All other species	18.1	26.7	30.0	13.1	30.0	20.0	14.8	18.8	21.7	18.2	33.3	18.1	18.0

[1] Less than one-tenth of 1 per cent.

TABLE 28.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES—Continued.

PACIFIC-NORTHWEST—Continued.

Montana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	100.0	.....	100.0	100.0	100.0	.....	100.0	100.0	.....	100.0	100.0	100.0
Douglas fir	20.7	24.6	.....	19.3	23.5	.....	.....	.....	25.0	.....	33.3	21.8	15.4
White pine	1.4	.....	.....	2.4	.....	.....	.....	.....	.....	.....	.....	1.1	2.6
Western pine	36.2	32.3	.....	39.8	29.4	50.0	.....	100.0	25.0	.....	.....	35.2	41.0
Cedar	.9	.....	.....	2.4	.....	.....	.....	.....	.....	.....	.....	1.1	.....
Spruce	5.5	13.9	.....	.....	5.9	.....	.....	.....	.....	.....	.....	5.6	5.1
All other species	35.3	29.2	.....	36.1	41.2	50.0	.....	.....	50.0	.....	66.7	35.2	35.9

SOUTHERN PINE REGION.

Total for 11 States.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	60.6	.....	.....	97.3	85.3	74.7	66.3	70.5	67.0	62.6	58.9	71.1	48.8
Longleaf	36.6	.....	.....	95.0	59.9	44.0	57.2	45.6	43.6	41.4	37.9	50.2	21.3
Shortleaf and loblolly	24.0	.....	.....	2.3	25.4	30.7	9.1	24.9	23.4	21.2	21.0	20.9	27.5
Cypress	6.4	.....	.....	.....	4.0	11.5	10.0	11.9	9.0	8.8	6.7	8.7	3.8
Hardwoods	33.0	.....	.....	2.7	10.7	13.8	23.7	17.6	24.0	28.6	34.4	20.2	47.4

Missouri (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	11.1	.....	.....	.....	.....	66.7	.....	23.5	.....	11.1	.....	13.5	8.5
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	11.1	.....	.....	.....	.....	66.7	.....	23.5	.....	11.1	.....	13.5	8.5
Cypress	9.1	.....	.....	.....	.....	.....	.....	11.8	50.0	11.1	14.3	11.5	6.4
Hardwoods	79.8	.....	.....	.....	.....	33.3	100.0	64.7	50.0	77.8	85.7	75.0	85.1

Arkansas.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	33.0	.....	.....	.....	86.2	45.7	19.7	67.5	39.7	25.0	22.0	42.7	24.0
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	33.0	.....	.....	.....	86.2	45.7	19.7	67.5	39.7	25.0	22.0	42.7	24.0
Cypress	2.8	.....	.....	.....	.....	.....	1.6	1.2	3.9	1.9	2.4	1.9	3.7
Hardwoods	64.2	.....	.....	.....	13.8	54.3	78.7	31.3	56.4	73.1	75.6	55.4	72.3

TABLE 28.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES—Continued.

SOUTHERN PINE REGION—Continued.

Texas.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	68.0	.....	.....	96.4	100.0	93.3	100.0	87.8	81.0	75.8	59.3	88.8	42.4
Longleaf	33.9	.....	.....	91.9	66.7	31.6	16.7	51.0	21.5	18.2	25.9	53.2	10.2
Shortleaf and loblolly	34.1	.....	.....	4.5	33.3	61.7	83.3	36.8	59.5	57.6	33.4	35.6	32.2
Cypress	.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.7
Hardwoods	31.7	.....	.....	3.6	.....	6.7	.....	12.2	19.0	24.2	40.7	11.2	56.9

Louisiana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	56.5	.....	.....	97.3	90.8	72.3	76.6	46.5	44.7	45.3	42.0	66.7	33.8
Longleaf	43.8	.....	.....	97.3	73.7	50.0	69.0	40.4	33.0	30.6	24.0	53.5	22.2
Shortleaf and loblolly	12.7	.....	.....	.....	17.1	22.3	7.6	6.1	11.7	14.7	18.0	13.2	11.6
Cypress	13.1	.....	.....	.....	5.3	19.6	3.8	31.6	22.3	16.0	18.0	14.6	9.7
Hardwoods	30.4	.....	.....	2.7	3.9	8.1	19.6	21.9	33.0	38.7	40.0	18.7	56.5

Mississippi.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	65.5	.....	.....	100.0	100.0	67.1	89.6	87.0	81.9	72.7	56.1	82.0	48.8
Longleaf	50.0	.....	.....	100.0	100.0	41.8	88.3	80.5	66.6	61.8	46.3	72.6	27.1
Shortleaf and loblolly	15.5	.....	.....	.....	.....	25.3	1.3	6.5	15.3	10.9	9.8	9.4	21.7
Cypress	2.0	.....	.....	.....	.....	6.3	.....	.....	1.4	5.5	2.4	2.1	1.9
Hardwoods	32.5	.....	.....	.....	.....	26.6	10.4	13.0	16.7	21.8	41.5	15.9	49.3

Alabama.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	67.5	.....	.....	.....	100.0	100.0	84.6	87.8	86.1	73.7	75.0	84.3	56.9
Longleaf	45.5	.....	.....	.....	100.0	77.8	76.9	73.0	83.3	57.9	54.2	71.9	28.9
Shortleaf and loblolly	22.0	.....	.....	.....	.....	22.2	7.7	14.8	2.8	15.8	20.8	12.4	28.0
Cypress	.4	.....	.....	.....	.....	.....	.....	.....	.....	2.6	.....	.5	.3
Hardwoods	32.1	.....	.....	.....	.....	.....	15.4	12.2	13.9	23.7	25.0	15.2	42.8

TABLE 28.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES—Continued.

SOUTHERN PINE REGION—Continued.

Florida.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	80.0	.....	.....	100.0	100.0	83.8	74.0	76.5	82.0	86.9	91.1	81.3	75.2
Longleaf	78.8	.....	.....	100.0	100.0	83.8	74.0	75.8	81.0	86.9	91.1	80.9	70.7
Shortleaf and loblolly	1.2	.....	.....	.....	.....	.....	.....	.7	1.0	.....	.....	.4	4.5
Cypress	14.5	.....	.....	.....	.....	16.2	21.8	19.8	14.0	11.9	7.1	16.0	8.9
Hardwoods	5.5	.....	.....	.....	.....	.....	4.2	3.7	4.0	1.2	1.8	2.7	15.9

Georgia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	68.9	.....	.....	.....	.....	50.0	9.1	100.0	71.9	68.4	78.3	62.4	71.0
Longleaf	40.2	.....	.....	.....	.....	50.0	9.1	100.0	65.6	68.4	60.9	56.9	35.1
Shortleaf and loblolly	28.7	.....	.....	.....	.....	.....	.....	.....	6.3	.....	17.4	5.5	35.9
Cypress	6.1	.....	.....	.....	.....	27.3	81.8	.....	9.4	15.8	8.7	21.1	1.4
Hardwoods	25.0	.....	.....	.....	.....	22.7	9.1	.....	18.7	15.8	13.0	16.5	27.6

South Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	100.0	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	62.5	.....	.....	.....	.....	81.8	100.0	58.1	85.0	50.0	52.4	66.7	59.4
Longleaf	15.0	.....	.....	.....	.....	15.1	.....	3.2	15.0	9.1	9.5	9.9	18.8
Shortleaf and loblolly	47.5	.....	.....	.....	.....	66.7	100.0	54.9	70.0	40.9	42.9	56.8	40.6
Cypress	8.5	.....	.....	.....	.....	9.1	.....	9.7	5.0	22.7	14.3	11.3	6.3
Hardwoods	29.0	.....	.....	100.0	.....	9.1	.....	32.2	10.0	27.3	33.3	22.0	34.3

North Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	59.7	.....	.....	.....	40.8	100.0	37.5	82.8	71.9	76.7	76.5	62.5	57.6
Longleaf	6.8	.....	.....	.....	.....	.....	.....	.....	3.1	3.3	5.9	1.6	10.6
Shortleaf and loblolly	52.9	.....	.....	.....	40.8	100.0	37.5	82.8	68.8	73.4	70.6	60.9	47.0
Cypress	7.0	.....	.....	.....	10.2	.....	29.2	3.4	3.1	3.3	.....	8.2	6.1
Hardwoods	33.3	.....	.....	.....	49.0	.....	33.3	13.8	25.0	20.0	23.5	29.3	36.3

TABLE 28.—HOLDINGS OF STANDING TIMBER IN THE INVESTIGATION AREA: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES—Continued.

SOUTHERN PINE REGION—Continued.

Virginia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	60.0	.....	.....	.....	.....	92.3	25.0	83.3	66.7	66.7	71.4	73.0	55.6
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	60.0	.....	.....	.....	.....	92.3	25.0	83.3	66.7	66.7	71.4	73.0	55.6
Cypress	1.4	.....	.....	.....	.....	.....	25.0	.....	.....	.....	.....	2.7	.9
Hardwoods	38.6	.....	.....	.....	100.0	7.7	50.0	16.7	33.3	33.3	28.6	24.3	43.5

LAKE STATES.

Total for 3 States.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	100.0	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White and Norway pine	17.7	.....	83.3	.....	38.8	10.8	25.3	23.5	11.1	11.8	17.2	21.7	10.3
Hemlock	26.6	.....	16.7	.....	14.6	37.8	19.7	30.3	41.7	39.1	34.5	30.4	19.5
Other conifers	13.8	.....	.....	.....	13.8	5.4	9.9	6.2	5.5	7.3	12.1	8.4	23.8
Hardwoods	41.9	.....	.....	.....	32.8	46.0	45.1	40.0	41.7	41.8	36.2	39.5	46.4

Michigan.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	100.0	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White and Norway pine	4.2	.....	50.0	.....	3.3	.....	8.8	6.2	2.0	5.2	7.1	5.1	2.4
Hemlock	31.5	.....	50.0	.....	23.4	31.3	23.6	31.3	42.0	39.7	39.3	33.0	28.7
Other conifers	10.9	.....	.....	.....	13.3	6.2	8.8	4.7	4.0	8.6	10.7	8.0	16.5
Hardwoods	53.4	.....	.....	.....	60.0	62.5	58.8	57.8	52.0	46.5	42.9	53.9	52.4

Wisconsin.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White and Norway pine	11.0	.....	.....	.....	16.7	19.0	10.0	20.3	4.2	11.4	9.1	12.7	5.5
Hemlock	39.7	.....	.....	.....	50.0	42.9	30.0	40.7	50.0	45.5	40.9	43.2	29.2
Other conifers	7.9	.....	.....	.....	.....	4.8	5.0	6.8	6.2	4.5	9.1	5.9	13.9
Hardwoods	41.4	.....	.....	.....	33.3	33.3	55.0	32.2	39.6	38.6	40.9	38.2	51.4

Minnesota.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	100.0	.....	100.0	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White and Norway pine	53.9	.....	100.0	.....	84.0	.....	76.5	81.8	90.0	62.5	75.0	81.5	24.8
Hemlock	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other conifers	27.1	.....	.....	.....	16.0	.....	17.6	9.1	10.0	12.5	25.0	14.3	40.7
Hardwoods	19.0	.....	.....	.....	.....	.....	5.9	9.1	.....	25.0	.....	4.2	34.5

CONCENTRATION MOST MARKED IN MOST VALUABLE SPECIES.—In holdings of 60 million and over in the Southern Pine Region, and in smaller holdings, respectively, the percentages of each kind of timber are as follows: Longleaf pine, 50.2 and 21.3; shortleaf and loblolly pine, 20.9 and 27.5; cypress, 8.7 and 3.8; hardwoods, 20.2 and 47.4. The valuable longleaf pine and cypress form about three-fifths of the larger holdings and one-fourth of the small; the low-value hardwoods, one-fifth of the larger and one-half the small. The 22.1 billion in group 3, which consists of 3 holdings and the relatively small amount owned by the Southern Pacific (see p. 98), is 95 per cent longleaf pine and only 2.7 per cent hardwoods. The 32.7 billion feet owned by the 8 holders in group 4 is 85.3 per cent yellow pine and 10.7 per cent hardwoods. The percentage of longleaf pine decreases from group 3 to group 11 in every case except group 6, while the percentage of hardwood increases in every case except group 7.

In Texas the timber in groups 1 to 10 is 53.2 per cent longleaf pine and only 11.2 per cent hardwood, while that in group 11 is only 10.2 per cent longleaf pine and 56.9 per cent hardwood. Eighty per cent of the hardwood in groups 1 to 10 is in groups 7 to 10. In Louisiana the timber in groups 1 to 10 is 53.5 per cent longleaf pine and only 18.7 per cent hardwood, while that in group 11 is only 22.2 per cent longleaf pine and 56.5 per cent hardwood. Hardwoods furnish only insignificant parts of the holdings in groups 3, 4, and 5. In Mississippi groups 1 to 10 have 72.6 per cent longleaf pine, while group 11 has only 27.1 per cent. Generally speaking, the shortleaf and loblolly pine in Mississippi has been much less profitable as an investment than the longleaf, and as a result the holdings in groups 1 to 10 are only 9.4 per cent shortleaf and loblolly and 72.6 per cent longleaf, while the holdings in group 11 are 27.1 per cent longleaf and 21.7 per cent shortleaf and loblolly. Groups 1 to 10 have only 15.9 per cent hardwoods, while group 11 has 49.3 per cent. In Alabama 71.9 per cent of the timber in groups 1 to 10 is longleaf pine and only 12.4 per cent shortleaf and loblolly, while in group 11 the two species are almost equal. The hardwoods are only 15.2 per cent of the timber in groups 1 to 10 and 42.8 per cent in group 11. Nearly all the timber in Florida is valuable longleaf and cypress. In Georgia the holdings in groups 1 to 10 are 56.9 per cent longleaf and only 5.5 per cent shortleaf, while the two species are almost equal in group 11. In South Carolina and North Carolina the division of yellow pine between longleaf and shortleaf and loblolly is of doubtful accuracy, and is therefore not significant.

In all three of the Lake States there is very high concentration in white and Norway pine and hemlock. In Minnesota there is a relatively very low concentration of the ownership of hardwoods, and of conifers other than white and Norway pine.

In the Lake States as a whole 79.7 per cent of the white and Norway pine and 74.4 per cent of the hemlock is in groups 1 to 10. Fifty-nine and nine-tenths per cent of the white and Norway pine is owned in groups 2 to 7, and 66.5 per cent of the hemlock is owned in groups 4 to 9. In Minnesota 61.6 per cent of the white and Norway pine and only 6.9 per cent of the hardwoods is owned in groups 2, 4, 6, and 7. In this State the timber in groups 1 to 10 is 81.5 per cent white and Norway pine and only 18.5 per cent other conifers and hardwoods, while that of group 11 is only 24.8 per cent white and Norway pine and 75.2 per cent other conifers and hardwoods.

The hardwood stands in Michigan and Wisconsin, unlike those in Minnesota and in the Southern Pine Region, are of high average value, and as a consequence the ownership is concentrated.

CONDITIONS INFLUENCING BUYERS IN MAKING LARGE TIMBER INVESTMENTS.—Forest land is not gathered into large holdings unless the buyers expect its value to increase. Most of the virgin forests contain a very large proportion of mature trees, and neither the amount nor the quality of the timber is materially changed by growth. It follows that investors look for the forest land which promises the most rapid rise of price per thousand feet. This may depend on several factors. Some species are more valuable than others, and the same species is better in one region than in another because of differences in quality, stand per acre, continuity of the forest, or other circumstances which affect the cost of logging. Again, investors will avoid regions where settlement and the development of the lumber industry have given the timber considerable value, and look for places where the timber is good, but the demand for it has not yet arisen. When Government forest land could be bought for $1.25 an acre, investors naturally bought such as had a good stand of the valuable species. For these reasons, the concentration of ownership is far greater in some sections than in others of every timber State. The same conditions explain the differences among the States.

It must not be forgotten that the importance of the large holdings is very inadequately indicated by the quantity of timber they contain. A further measure of their importance is their value; and that is wholly out of proportion to their quantity. For instance, compare a large holder of Louisiana cypress worth $5 to $8 per thousand feet with a small holder of gum, willing to almost give away his timber to rid the land of it; a large holder of Mississippi longleaf worth $4 or $5 a thousand with a small holder of scattered shortleaf worth less than $1; or a large holder of the best Texas shortleaf worth almost as much as the longleaf with a small holder of scattered shortleaf of poor quality worth only a fraction as much. In Mississippi 49.8 per cent of the timber is in holdings of less than 60 million feet each, while such holdings have only 21.2 per cent of the total in Florida. This has come about because the timber in Florida is more uniformly valuable than in Mississippi. Half the timber in these smaller Mississippi holdings is low-priced hardwoods, of which there is very little in Florida.

The longleaf pine grows in almost pure stands, and a great part of the cypress forests of Louisiana and Florida contain only small proportions of hardwood. There is practically no intermingling of hardwoods with the various species of pine. Under such conditions it is practicable to buy one kind of timber to the nearly complete exclusion of others. Outside of the Louisiana and Florida cypress forests a considerable amount of cypress grows as a minor species with hardwoods. The various hardwoods always grow in mixed stands, so that there is no such thing as a holding of one kind alone. Some of the trees in a hardwood holding would bring a high price, but since they are mixed with great quantities of comparatively poor timber, especially gum, the value of the mixed stand is low.

Large investors in Minnesota white and Norway pine, like investors in the finest virgin southern pine and cypress, have been able to pass by the other conifers and the hardwoods.

In the Douglas fir region the lower-priced species grow here and there among the fir, so that the ownership of one goes with that of the other. In those parts of the Pacific-Northwest where the pine is of relatively low value or where the less valuable species predominate the property has been left to the small investor, save for the railroad grants.

Section 8. Relative holdings of more desirable and less desirable timber in certain States, by groups.

The greatest profits from timber investments have been made in certain well-defined forest areas which were of low market value at the time of purchase and have since risen rapidly on account of the fine quality of their timber and the comparatively cheap logging. By selecting such forest areas a very large proportion of the valuable standing timber in the investigation area could be segregated, of which the ownership is exceedingly concentrated. In every timber State the concentration of ownership is far higher in some parts than in others, and the districts in which the large investors have bought are those in which, because of higher quality and better location, there has been the highest rate of increase in value.

Such contrasts are most conveniently shown by comparing the ownership of the more desirable with that of the less desirable species in whole States. In the Pacific-Northwest the variety of species is far less than in the South. The forests are almost wholly coniferous, and there are no such wide differences of value as between yellow pine and the least valuable hardwoods, like the gums. Redwood grows in a narrow strip along the coast almost wholly separate from other timber, and the ownership of it is highly concentrated, as is shown below on page 155; but for the most part the proportion of one species in the larger holdings of the Pacific-Northwest does not very greatly differ from that of another. (See Table 27.)

In Wisconsin and Michigan and in the South Atlantic States, except Florida, the virgin stand of the most desirable species is largely cut off. In the Gulf States and in Arkansas and Minnesota there are still large stands of virgin pine, and in Louisiana and Florida of cypress; and the other species, taken in the mass, are far below these in average value. Particular kinds of hardwood, as some varieties of oak and hickory, are valuable, but these grow intermingled with other species of small value. The only comparison that can be conveniently made on a large scale is that between pine and cypress on the one hand and all remaining species on the other.

The following tables show how much higher is the proportion of the more desirable than of the less desirable species in the larger holdings in the States where such a separation can be readily made—Arkansas, Texas, Louisiana, Mississippi, Alabama, Florida, and Minnesota. The "more desirable timber," as the phrase is here used, includes the white and Norway pine of Minnesota, the yellow pine of Arkansas, Texas, Louisiana, and Florida, the longleaf pine of Mississippi and Alabama, and the cypress of Florida and Louisiana. The "less desirable timber" includes all other timber reported from these States. Table 29 shows by groups the ownership of the "more desirable timber" and the "less desirable timber" separately.

TABLE 29.—HOLDINGS OF STANDING TIMBER IN CERTAIN STATES, CLASSIFIED AS MORE DESIRABLE AND LESS DESIRABLE, AND GROUPED BY SIZE OF HOLDING OF ALL SPECIES IN THE INVESTIGATION AREA.

[In billions of board feet. Thus, 309.8=309,800,000,000 board feet. Each holding included in this table is in the same group as in Table 20. "More desirable timber" includes white and Norway pine in Minnesota, yellow pine in Arkansas, Texas, Louisiana, and Florida, longleaf pine in Mississippi and Alabama, and cypress in Florida and Louisiana. "Less desirable timber" includes all other timber reported from these States.]

More desirable timber.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	309.8	.....	0.4	21.5	30.9	32.2	36.0	42.8	31.1	22.8	14.8	232.5	77.3
Arkansas	26.0	.....	.....	.....	2.5	1.6	1.2	5.6	3.1	1.3	.9	16.2	9.8
Texas	44.9	.....	.....	10.8	3.6	5.6	.6	4.3	3.4	2.5	1.6	32.4	12.5
Louisiana	83.4	.....	.....	3.6	14.6	13.6	12.7	8.9	6.3	4.6	3.0	67.3	16.1
Mississippi	47.6	.....	.....	6.5	4.3	3.3	6.8	3.7	4.8	3.4	1.9	34.7	12.9
Alabama	25.6	.....	.....	.....	1.0	.7	2.0	5.4	3.0	2.2	1.3	15.6	10.0
Florida	69.8	.....	.....	.6	.7	7.4	11.4	13.1	9.6	8.3	5.5	56.6	13.2
Minnesota	12.5	.....	.4	.....	4.2	.....	1.3	1.8	.9	.5	.6	9.7	2.8

TABLE 29.—HOLDINGS OF STANDING TIMBER IN CERTAIN STATES, CLASSIFIED AS MORE DESIRABLE AND LESS DESIRABLE, AND GROUPED BY SIZE OF HOLDING OF ALL SPECIES IN THE INVESTIGATION AREA—Continued.

Less desirable timber.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	203.4	.....	.....	0.5	1.8	8.3	10.4	9.6	12.1	11.7	9.9	64.3	139.1
Arkansas	52.7	.....	.....	.....	.4	1.9	4.9	2.7	4.7	3.9	3.2	21.7	31.0
Texas	21.1	.....	.....	.4	.....	.4	.....	.6	.8	.8	1.1	4.1	17.0
Louisiana	36.4	.....	.....	.1	.6	1.2	3.1	2.5	3.1	2.9	2.0	15.5	20.9
Mississippi	47.7	.....	.....	.....	.....	4.6	.9	.9	2.4	2.1	2.2	13.1	34.6
Alabama	30.7	.....	.....	.....	.....	.2	.6	2.0	.6	1.6	1.1	6.1	24.6
Florida	4.1	.....	.....	.....	.....	.....	.5	.5	.4	.1	.1	1.6	2.5
Minnesota	10.7	.....	.....	.....	.8	.....	.4	.4	.1	.3	.2	2.2	8.5

Table 30 gives the percentage of the more desirable timber and of the less desirable timber, separately, in holdings of each size group, for each of the States named and for the total in the seven States.

TABLE 30.—HOLDINGS OF STANDING TIMBER SHOWN IN TABLE 29: DISTRIBUTION BY SIZE GROUPS, IN PERCENTAGES.

[Percentages computed from Table 29. See note at head of Table 29.]

More desirable timber.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	0.1	6.9	10.0	10.4	11.6	13.8	10.0	7.4	4.8	75.0	25.0
Arkansas	100.0	.....	.....	.....	9.6	6.2	4.6	21.5	11.9	5.0	3.5	62.3	37.7
Texas	100.0	.....	.....	24.0	8.0	12.5	1.3	9.6	7.6	5.6	3.6	72.2	27.8
Louisiana	100.0	.....	.....	4.3	17.5	16.3	15.2	10.7	7.6	5.5	3.6	80.7	19.3
Mississippi	100.0	.....	.....	13.7	9.0	6.9	14.3	7.8	10.1	7.1	4.0	72.9	27.1
Alabama	100.0	.....	.....	.....	3.9	2.7	7.8	21.1	11.7	8.6	5.1	60.9	39.1
Florida	100.0	.....	.....	.9	1.0	10.6	16.3	18.8	13.7	11.9	7.9	81.1	18.9
Minnesota	100.0	.....	3.2	.....	33.6	.....	10.4	14.4	7.2	4.0	4.8	77.6	22.4

Less desirable timber.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	0.2	0.9	4.1	5.1	4.7	5.9	5.8	4.9	31.6	68.4
Arkansas	100.0	.....	.....	.....	.8	3.6	9.3	5.1	8.9	7.4	6.1	41.2	58.8
Texas	100.0	.....	.....	1.9	.....	1.9	.....	2.8	3.8	3.8	5.2	19.4	80.6
Louisiana	100.0	.....	.....	.3	1.6	3.3	8.5	6.9	8.5	8.0	5.5	42.6	57.4
Mississippi	100.0	.....	.....	.....	.....	9.7	1.9	1.9	5.0	4.4	4.6	27.5	72.5
Alabama	100.0	.....	.....	.....	.....	.6	2.0	6.5	2.0	5.2	3.6	19.9	80.1
Florida	100.0	.....	.....	.....	.....	.....	12.2	12.2	9.8	2.4	2.4	39.0	61.0
Minnesota	100.0	.....	.....	.....	7.5	.....	3.7	3.8	.9	2.8	1.9	20.6	79.4

In Table 31 the percentages of Table 30 are cumulated, so as to show what per cent of the more desirable and of the less desirable timber is in holdings of a given size and larger.

TABLE 31.—HOLDINGS OF STANDING TIMBER SHOWN IN TABLE 29: DISTRIBUTION BY SIZE GROUPS, IN PERCENTAGES, SHOWN CUMULATIVELY.

[Computed by adding the percentages in Table 30.]

More desirable timber.

	Group 1.	Groups 1-2.	Groups 1-3.	Groups 1-4.	Groups 1-5.	Groups 1-6.	Groups 1-7.	Groups 1-8.	Groups 1-9.	Groups 1-10.	Groups 1-11.
Total	....	0.1	7.0	17.0	27.4	39.0	52.8	62.8	70.2	75.0	100.0
Arkansas	....	.....	.....	9.6	15.8	20.4	41.9	53.8	58.8	62.3	100.0
Texas	....	.....	24.0	32.0	44.5	45.8	55.4	63.0	68.6	72.2	100.0
Louisiana	....	.....	4.3	21.8	38.1	53.3	64.0	71.6	77.1	80.7	100.0
Mississippi	....	.....	13.7	22.7	29.6	43.9	51.7	61.8	68.9	72.9	100.0
Alabama	....	.....	.....	3.9	6.6	14.4	35.5	47.2	55.8	60.9	100.0
Florida	....	.....	.9	1.9	12.5	28.8	47.6	61.3	73.2	81.1	100.0
Minnesota	....	3.2	3.2	36.8	36.8	47.2	61.6	68.8	72.8	77.6	100.0

Less desirable timber.

Total	....	.....	.2	1.1	5.2	10.3	15.0	20.9	26.7	31.6	100.0
Arkansas	....	.....	.....	.8	4.4	13.7	18.8	27.7	35.1	41.2	100.0
Texas	....	.....	1.9	1.9	3.8	3.8	6.6	10.4	14.2	19.4	100.0
Louisiana	....	.....	.3	1.9	5.2	13.7	20.6	29.1	37.1	42.6	100.0
Mississippi	....	.....	.....	.....	9.7	11.6	13.5	18.5	22.9	27.5	100.0
Alabama	....	.....	.....	.....	.6	2.6	9.1	11.1	16.3	19.9	100.0
Florida	....	.....	.....	.....	.....	12.2	24.4	34.2	36.6	39.0	100.0
Minnesota	....	.....	.....	7.5	7.5	11.2	15.0	15.9	18.7	20.6	100.0

Table 30 shows that groups 2 and 3, composed of holdings of 5 billion feet or more, have 7 per cent of the more desirable timber in the seven States, and two-tenths of 1 per cent of the less desirable. Group 4 (holdings of 3½ to 5 billion feet each) has 10 per cent of the more desirable and less than 1 per cent of the less desirable.

In Texas, 24 per cent of the more desirable timber is in the highest group, group 3, with less than 2 per cent of the less desirable; groups 4 and 5 together have 20 per cent of the more desirable and again but 2 per cent of the less desirable. In Louisiana, 17.5 per cent of the more desirable, and only 1.6 per cent of the less, is in group 4. In Mississippi, groups 3 and 4 show 22.7 per cent of the more desirable and no appreciable share of the less desirable.

From Table 31 it appears that the holdings in groups 1 to 5 (all over 2 billion feet each) contain 44.5 per cent of the more desirable timber in Texas and only 3.8 per cent of the less desirable; 38.1 per cent of the more desirable timber in Louisiana and only 5.2 per cent of the less desirable; 36.8 per cent of the more desirable timber in Minnesota and only 7.5 per cent of the less desirable.

More than half the more desirable timber of the seven States is in holdings of groups 1 to 7, having more than half a billion feet each. Some idea of the importance of a holding as large as half a billion feet may be gained by noting that, if it consist of yellow pine worth $4 a thousand, its value is $2,000,000. While holdings of such size and larger have 52.8 per cent of the more desirable timber in the table, they have only 15 per cent of the less desirable. In Louisiana they have 64 per cent of the more desirable and 20.6 per cent of the less desirable; in Minnesota, 61.6 per cent of the more desirable and only 15 per cent of the less desirable.

Holdings of 60 million feet and more have 75 per cent of the more desirable timber in the seven States, and only 31.6 per cent of the less desirable. A holding of 60 million feet is a very important investment, worth $240,000 at the moderate price of $4 a thousand. Even below the 60-million line the great bulk of the timber is owned by large investors; the amount owned by small investors is relatively unimportant. Yet holdings above that line include three-fourths of the more desirable timber, while smaller holdings have two-thirds of the less desirable.

Moreover, the disproportion increases with the size of the holdings. This is clearly brought out by the following table, which compares the percentages of more desirable and of less desirable timber held by the several groups.

TABLE 32.—PERCENTAGES OF THE MORE DESIRABLE AND OF THE LESS DESIRABLE TIMBER OF TABLE 29, IN HOLDINGS OF THE SEVERAL SIZE GROUPS.

	More desirable timber.		Less desirable timber.	
	Billions of feet.	*Per cent.*	*Billions of feet.*	*Per cent.*
Total	309.8	100.0	203.4	100.0
Group 11	77.3	25.0	139.1	68.4
Group 10	14.8	4.8	9.9	4.9
Group 9	22.8	7.4	11.7	5.8
Group 8	31.1	10.0	12.1	5.9
Group 7	42.8	13.8	9.6	4.7
Group 6	36.0	11.6	10.4	5.1
Group 5	32.2	10.4	8.3	4.1
Group 4	30.9	10.0	1.8	.9
Group 3	21.5	6.9	.5	.2
Group 2	.4	.1		
Group 1				

The second and fourth columns of this table show that group 11, composed of holdings under 60 million feet each, has two-thirds of the less desirable timber and only one-fourth of the more desirable. Group 10, from 60 to 125 million feet, has about the same proportion of one class of timber as of the other. In groups 5, 6, and 7, ranging from one-half to 3½ billion feet, the proportion of the more desirable is two or three times that of the less desirable.

Comparing the entries in the first column with those in the third, it will be seen that the holdings in group 11 contain only about half as much of the more desirable timber as of the less desirable, while in group 10 the more desirable timber is 1½ times the less desirable, the ratio increasing up to group 7, where it is 4½. Group 4 contains 17 times as much of the more desirable as of the less desirable timber, and group 3 has practically none of the less desirable.

CONCENTRATION OF OWNERSHIP IN THE SEVERAL STATES OF THE INVESTIGATION AREA AND ON THE PACIFIC SLOPE.

Excepting in Tables 23 to 25, which occur on pages 110 and 111, holdings have thus far been grouped according to size in the investigation area and percentages based on the total timber involved. Considerable interest attaches to separate classifications for each State and for selected portions of the investigation area, particularly for the Pacific slope; i. e., California and those portions of Oregon and Washington west of the Cascades. The importance of each group on the Pacific slope and in the individual States is shown in the two sections following. The classifications and percentages in each case are based on the total timber in the particular area and not on that in the entire investigation area. That is to say, in the first case the holders are grouped according to the amounts of timber owned on the Pacific slope; for instance, to come in group 3 a holder must have over 5 billion feet in that particular area. A similar basis is used for individual States, so that the table shows the order of size of groups of holdings in that State. This manner of presentation brings out some points better than the preceding table; it will also be of much local interest. The relations of the groups are not the same in any separate State or selected area as they are in the entire investigation area. Thus, group 1 has 13.6 per cent (Table 21) of all the timber in the investigation area, 24.4 per cent (Table 40) on the Pacific slope, and 34.6 per cent (Table 34) in Washington.

The tables here given, it may be noted, are presented mainly for study by those whose interest may be largely local and therefore are not extensively discussed here.

Section 9. Concentration of ownership by size of holding in each State separately by species.

A separate classification for each State, according to size in the State, is shown in Table 33. However, it is to be noted that the

Southern Pacific, Weyerhaeuser Timber Company, and Northern Pacific always constitute group 1; but otherwise the figures for each State are entirely independent of those for other States. For instance, a holding of 100 million in Texas is placed in group 10, even though the owner may have several billion feet elsewhere in the investigation area. The number of holdings in each group is shown in italics just above the entry for the total timber. An addition of the number of holders shown for the States would give totals different from those in Table 20 for the geographic divisions and the investigation area. This is due to the different basis of classification. In a number of cases, two or more groups have been consolidated in order not to show one or two holders alone. Thus, in Washington, groups 3 and 4 are consolidated, giving a total of 26 billion feet in three holdings. Such consolidated columns are centered below the groups they contain. The 7 holders with 100.1 billion feet in groups 1 to 3 in California include the Southern Pacific with 35.1 billion, leaving 6 holders in groups 2 and 3 with 65 billion. The Southern Pacific is included merely to make the subdivision by species more representative (see p. 117); and for a similar reason, the Northern Pacific holding of 4.5 billion in Idaho, the total of which is shown separately on page 113, is included with group 3. In some of the consolidations of groups a middle group may contain no holdings, in which case a footnote states in which of the groups the timber is owned. When groups are consolidated the figures in italics show the total number of holdings in the groups consolidated. But the number of holdings in each one of the groups thus blocked together is given in Table 48, page 173, in connection with the acreage on which the timber of Table 33 stands.

TABLE 33.—HOLDINGS OF STANDING TIMBER IN EACH STATE, CLASSIFIED BY SIZE IN THE STATE AND BY SPECIES.

[In billions of board feet. Thus, 100.1=100,100,000,000 board feet. This table differs from Table 26 in that the holdings in each State are here grouped according to their size in that State instead of according to their size in the investigation area. See p. 94 for a description of the groups. The number of timber holdings in each group is shown in italics.]

PACIFIC-NORTHWEST.

California.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	248.1		*7* 100.1		*7* 30.2	*9* 25.4	*16* 22.5	*23* 16.3	*20* 6.2	*28* 4.8	*40* 3.8	*150* 209.3	38.8
Douglas fir	45.2		18.5		7.3	4.0	1.9	1.3	.8	.6	.4	34.8	10.4
Western pine	61.2		31.4		5.2	1.2	3.5	3.9	.8	.6	1.2	47.8	13.4
Sugar pine	23.8		9.4		2.2	.7	2.6	2.6	.5	.3	.5	18.8	5.0
Redwood	101.9		35.2		14.7	18.5	12.4	6.0	3.5	3.2	1.5	95.0	6.9
Cedar	3.4		.8		.6	.4	.2	.4	.1	.....	.....	2.5	.9
Spruce	1.2		.1		.2	.....	.3	.3	.1	.....	.....	1.0	.2
All other species	11.4		4.7		.....	.6	1.6	1.8	.4	.1	.2	9.4	2.0

TABLE 33.—HOLDINGS OF STANDING TIMBER IN EACH STATE, CLASSIFIED BY SIZE IN THE STATE AND BY SPECIES—Continued.

PACIFIC-NORTHWEST—Continued.

Oregon.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	398.1	*2* 89.2	*5* 54.8		*6* 26.3	*9* 23.7	*29* 42.8	*43* 31.4	*40* 15.1	*69* 13.2	*111* 8.9	*314* 305.4	92.7
Douglas fir	273.5	54.4	43.0		23.2	18.8	29.8	20.2	10.0	9.3	6.1	214.8	58.7
White pine	.2	.....	....		.....	.....	.....	.....	.....	.....	.1	.1	.1
Western pine	58.5	16.1	5.0		.....	2.4	5.6	5.2	2.5	1.6	1.2	39.6	18.9
Sugar pine	10.9	6.0	.3		.....	.2	.5	.6	.4	.3	.2	8.5	2.4
Cedar	12.6	4.1	1.2		.7	.6	1.1	.7	.4	.9	.3	10.0	2.6
Hemlock	23.9	6.3	2.8		1.4	.5	3.7	2.2	1.1	.7	.6	19.3	4.6
Spruce	10.1	1.3	.8		.7	.8	1.0	1.5	.6	.2	.2	7.1	3.0
All other species	8.4	1.0	1.7		.3	.4	1.1	1.0	.1	.2	.2	6.0	2.4

Washington.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	294.6	*2* 102.1	.....	*3* 26.0		*8* 21.5	*19* 25.3	*34* 22.7	*46* 16.3	*84* 15.1	*99* 8.2	*295* 237.2	57.4
Douglas fir	193.6	71.4	.....	14.8		14.2	17.9	13.8	10.5	9.5	5.3	157.4	36.2
White pine	.7	.2	.....	....		.....	.1	.....	.....	.1	.1	.5	.2
Western pine	12.5	4.6	.....	....		.3	.7	.7	.9	.9	.2	8.3	4.2
Cedar	37.0	9.9	.....	3.4		2.9	3.5	4.0	2.5	2.4	1.4	30.0	7.0
Hemlock	33.0	10.2	.....	5.5		3.5	1.7	2.6	1.6	1.2	.7	27.0	6.0
Spruce	8.9	2.3	.....	1.4		.5	1.0	.9	.5	.5	.3	7.4	1.5
All other species	8.9	3.5	.....	.9		.1	.4	.7	.3	.5	.2	6.6	2.3

Idaho.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	50.4	*3* [1] 23.3			......	*3* 6.0		*4* 3.0	*9* 3.0	*8* 1.6	*9* .7	*36* 37.6	12.8
Douglas fir	5.1	2.1			......	.6		.5	.3	.1	.1	3.7	1.4
White pine	18.4	10.2			......	2.6		.6	1.2	.6	.2	15.4	3.0
Western pine	13.3	5.3			......	.5		1.3	.7	.3	.2	8.3	5.0
Cedar	3.5	1.6			......	.6		.....	.2	.2	.....	2.6	.9
Hemlock	.5	.4			......	....		.....	.1	.....	.....	.5	.....
Spruce	.5	.1			......	.1		.....	.....	.1	.....	.3	.2
All other species	9.1	3.6			......	1.6		.6	.5	.3	.2	6.8	2.3

Montana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	21.8	*1* 6.5	.....	*5* [2] 10.8						*6* .6		*12* 17.9	3.9
Douglas fir	4.5	1.6	.....	2.2						.1		3.9	.6
White pine	.3	.....	.....	.2						....		.2	.1
Western pine	7.9	2.1	.....	4.0						.2		6.3	1.6
Cedar	.2	.....	.....	.2						....		.2	.....
Spruce	1.2	.9	.....	.1						....		1.0	.2
All other species	7.7	1.9	.....	4.1						.3		6.3	1.4

[1] Groups 1 and 3.

[2] Groups 3, 6, and 8.

TABLE 33.—HOLDINGS OF STANDING TIMBER IN EACH STATE, CLASSIFIED BY SIZE IN THE STATE AND BY SPECIES—Continued.

SOUTHERN PINE REGION.

Missouri (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	9.9	....	....	....	....	....	....	*3* 2.1	*4* 1.5	*5* .9	*9* .7	*21* 5.2	4.7
Yellow pine	1.1	....	....	....	....	....	....	.4	.2	.1	....	.7	.4
Longleaf	....	....	....	....	....	....	....	....	....	....	....	....	....
Shortleaf and loblolly	1.1	....	....	....	....	....	....	.4	.2	.1	....	.7	.4
Cypress	.9	....	....	....	....	....	....	.2	.2	.1	.1	.6	.3
Hardwoods	7.9	....	....	....	....	....	....	1.5	1.1	.7	.6	3.9	4.0

Arkansas.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	78.7	....	....	....	....	*7* 11.1		*13* 8.1	*21* 7.7	*35* 6.1	*58* 4.9	*134* 37.9	40.8
Yellow pine	26.0	....	....	....	....	4.8		5.6	3.3	1.5	1.0	16.2	9.8
Longleaf	....	....	....	....	....	....		....	....	....	....	....	....
Shortleaf and loblolly	26.0	....	....	....	....	4.8		5.6	3.3	1.5	1.0	16.2	9.8
Cypress	2.2	....	....	....	....	....		.1	.3	.1	.2	.7	1.5
Hardwoods	50.5	....	....	....	....	6.3		2.4	4.1	4.5	3.7	21.0	29.5

Texas.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	66.0	....	....	*3* [1] 14.6			*3* 5.0	*9* 5.9	*12* 4.5	*21* 3.6	*33* 2.9	*81* 36.5	29.5
Yellow pine	44.9	....	....	14.1			4.9	5.1	3.7	2.9	1.7	32.4	12.5
Longleaf	22.4	....	....	12.2			2.4	2.6	.9	.6	.7	19.4	3.0
Shortleaf and loblolly	22.5	....	....	1.9			2.5	2.5	2.8	2.3	1.0	13.0	9.5
Cypress	.2	....	....	....			....	....	....	....	....	....	.2
Hardwoods	20.9	....	....	.5			.1	.8	.8	.7	1.2	4.1	16.8

Louisiana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	119.8	....	....	....	*10* 31.9		*10* 14.6	*17* 11.9	*28* 9.7	*50* 8.3	*74* 6.4	*189* 82.8	37.0
Yellow pine	67.7	....	....	....	26.5		11.2	6.5	4.3	3.9	2.8	55.2	12.5
Longleaf	52.5	....	....	....	20.8		10.0	6.0	3.5	2.5	1.5	44.3	8.2
Shortleaf and loblolly	15.2	....	....	....	5.7		1.2	.5	.8	1.4	1.3	10.9	4.3
Cypress	15.7	....	....	....	3.7		.6	3.5	2.1	1.2	1.0	12.1	3.6
Hardwoods	36.4	....	....	....	1.7		2.8	1.9	3.3	3.2	2.6	15.5	20.9

[1] Groups 3 and 5.

TABLE 33.—HOLDINGS OF STANDING TIMBER IN EACH STATE, CLASSIFIED BY SIZE IN THE STATE AND BY SPECIES—Continued.

SOUTHERN PINE REGION—Continued.

Mississippi.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
					2	*4*	*4*	*7*	*24*	*36*	*59*	*136*	
Total	95.3	....	....	....	8.4	9.1	6.1	4.5	8.3	6.2	5.2	47.8	47.5
Yellow pine	62.4	....	....	....	8.4	6.9	6.0	3.9	6.8	4.3	2.9	39.2	23.2
Longleaf	47.6	....	....	....	8.4	5.2	6.0	3.9	5.2	3.7	2.3	34.7	12.9
Shortleaf and loblolly	14.8	....	....	....	....	1.7	....	....	1.6	.6	.6	4.5	10.3
Cypress	1.9	....	....	....	....	.5	....	....	.1	.3	.1	1.0	.9
Hardwoods	31.0	....	....	....	....	1.7	.1	.6	1.4	1.6	2.2	7.6	23.4

Alabama.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
							13		*16*	*23*	*37*	*89*	
Total	56.3	....	....	....	....	....	9.2		5.4	4.1	3.0	21.7	34.6
Yellow pine	38.0	....	....	....	....	....	8.5		4.4	3.1	2.3	18.3	19.7
Longleaf	25.6	....	....	....	....	....	7.6		3.8	2.5	1.7	15.6	10.0
Shortleaf and loblolly	12.4	....	....	....	....	....	.9		.6	.6	.6	2.7	9.7
Cypress	.2	....	....	....	....	....	....		....	.1	....	.1	.1
Hardwoods	18.1	....	....	....	....	....	.7		1.0	.9	.7	3.3	14.8

Florida.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
						2	*9*	*19*	*33*	*52*	*67*	*182*	
Total	73.9	....	....	....	....	6.0	12.9	13.0	11.4	9.0	5.9	58.2	15.7
Yellow pine	59.1	....	....	....	....	4.9	9.8	10.1	9.5	7.7	5.3	47.3	11.8
Longleaf	58.2	....	....	....	....	4.9	9.8	10.1	9.4	7.6	5.3	47.1	11.1
Shortleaf and loblolly	.9	....	....	....	....	....	....	....	.1	.1	....	.2	.7
Cypress	10.7	....	....	....	....	1.1	2.6	2.5	1.5	1.1	.5	9.3	1.4
Hardwoods	4.1	....	....	....	....	....	.5	.4	.4	.2	.1	1.6	2.5

Georgia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
						2			*9*	*12*	*31*	*54*	
Total	46.0	....	....	....	....	3.2		....	2.9	1.9	2.9	10.9	35.1
Yellow pine	31.7	....	....	....	....	1.2		....	2.1	1.3	2.2	6.8	24.9
Longleaf	18.5	....	....	....	....	1.2		....	1.9	1.3	1.8	6.2	12.3
Shortleaf and loblolly	13.2	....	....	....	....	....		....	.2	....	.4	.6	12.6
Cypress	2.8	....	....	....	....	1.4		....	.2	.3	.4	2.3	.5
Hardwoods	11.5	....	....	....	....	.6		....	.6	.3	.3	1.8	9.7

TABLE 33.—HOLDINGS OF STANDING TIMBER IN EACH STATE, CLASSIFIED BY SIZE IN THE STATE AND BY SPECIES—Continued.

SOUTHERN PINE REGION—Continued.

South Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
						5			*8*	*14*	*32*	*-59*	
Total	30.7	.....	.....	.....	.....	[1]5.4			2.7	2.4	2.7	13.2	17.5
Yellow pine	19.2	.....	.....	.....	.....	4.0			2.1	1.2	1.5	8.8	10.4
Longleaf	4.6	.....	.....	.....	.....	.5			.2	.3	.3	1.3	3.3
Shortleaf and loblolly	14.6	.....	.....	.....	.....	3.5			1.9	.9	1.2	7.5	7.1
Cypress	2.6	.....	.....	.....	.....	.4			.2	.6	.3	1.5	1.1
Hardwoods	8.9	.....	.....	.....	.....	1.0			.4	.6	.9	2.9	6.0

North Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
					8				*9*	*21*	*25*	*68*	
Total	42.9	.....	.....	.....	[2]9.6				3.2	3.5	2.1	18.4	24.5
Yellow pine	25.6	.....	.....	.....	4.9				2.6	2.5	1.5	11.5	14.1
Longleaf	2.9	.....	.....	.....	.....				.1	.1	.1	.3	2.6
Shortleaf and loblolly	22.7	.....	.....	.....	4.9				2.5	2.4	1.4	11.2	11.5
Cypress	3.0	.....	.....	.....	1.2				.1	.1	.1	1.5	1.5
Hardwoods	14.3	.....	.....	.....	3.5				.5	.9	.5	5.4	8.9

Virginia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
								2	*2*	*2*	*9*	*15*	
Total	14.5	.....	.....	.....	.....	.....	.....	1.9	.7	.3	.8	3.7	10.8
Yellow pine	8.7	.....	.....	.....	.....	.....	.....	1.7	.3	.2	.5	2.7	6.0
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	8.7	.....	.....	.....	.....	.....	.....	1.7	.3	.2	.5	2.7	6.0
Cypress	.2	.....	.....	.....	.....	.....	.....	.....	.1	.....	.....	.1	.1
Hardwoods	5.6	.....	.....	.....	.....	.....	.....	.2	.3	.1	.3	.9	4.7

LAKE STATES.

Michigan.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
					12				*21*	*36*	*41*	*110*	
Total	47.6	.....	.....	.....	[2]13.2				7.4	6.8	3.8	31.2	16.4
White and Norway pine	2.0	.....	.....	.....	.7				.2	.4	.3	1.6	.4
Hemlock	15.0	.....	.....	.....	3.4				2.7	2.8	1.4	10.3	4.7
Other conifers	5.2	.....	.....	.....	1.1				.5	.5	.4	2.5	2.7
Hardwoods	25.4	.....	.....	.....	8.0				4.0	3.1	1.7	16.8	8.6

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[1] Groups 5 and 7.

[2] Groups 4, 6, and 7.

TABLE 33.—HOLDINGS OF STANDING TIMBER IN EACH STATE, CLASSIFIED BY SIZE IN THE STATE AND BY SPECIES—Continued.

LAKE STATES—Continued.

Wisconsin.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	29.2	.....	.....	.....	.....	.....	*10* 7.0		*18* 6.4	*34* 5.8	*34* 2.8	*96* 22.0	7.2
White and Norway pine	3.2	.....	.....	.....	.....	.....	.9		1.0	.6	.3	2.8	.4
Hemlock	11.6	.....	.....	.....	.....	.....	3.0		2.7	2.7	1.1	9.5	2.1
Other conifers	2.3	.....	.....	.....	.....	.....	.4		.3	.3	.3	1.3	1.0
Hardwoods	12.1	.....	.....	.....	.....	.....	2.7		2.4	2.2	1.1	8.4	3.7

Minnesota.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	23.2	.....	.....	.....	*6* [1]7.9				*4* 1.5	*8* 1.2	*14* 1.3	*32* 11.9	11.3
White and Norway pine	12.5	.....	.....	.....	6.8				1.2	.7	1.0	9.7	2.8
Hemlock	.....	.....	.....	.....	.....				.....	.....	.....	.....	.....
Other conifers	6.3	.....	.....	.....	1.0				.1	.4	.2	1.7	4.6
Hardwoods	4.4	.....	.....	.....	.1				.2	.1	.1	.5	3.9

[1] Groups 4, 6, and 7.

Tables 34 and 35 are computed from Table 33, one showing the per cent distribution of each species by ownership groups, and the other showing the per cent distribution of the timber in each ownership group by species.

TABLE 34.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF EACH SPECIES, BY SIZE GROUPS, IN PERCENTAGES OF THE TOTAL IN EACH STATE.

[Percentages computed from Table 33. See note at head of Table 33.]

PACIFIC-NORTHWEST.

California.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	*7* 40.4			*7* 12.2	*9* 10.2	*16* 9.1	*23* 6.6	*20* 2.5	*28* 1.9	*40* 1.5	*150* 84.4	15.6
Douglas fir	100.0	40.9			16.2	8.8	4.2	2.9	1.8	1.3	.9	77.0	23.0
Western pine	100.0	51.3			8.5	2.0	5.7	6.4	1.3	1.0	1.9	78.1	21.9
Sugar pine	100.0	39.5			9.3	2.9	10.9	10.9	2.1	1.3	2.1	79.0	21.0
Redwood	100.0	34.5			14.4	18.2	12.2	5.9	3.4	3.1	1.5	93.2	6.8
Cedar	100.0	23.5			17.6	11.8	5.9	11.8	2.9	.....	.....	73.5	26.5
Spruce All other species	100.0	38.1			1.6	4.7	15.1	16.7	4.0	.8	1.6	82.6	17.4

TABLE 34.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF EACH SPECIES, BY SIZE GROUPS, IN PERCENTAGES OF THE TOTAL IN EACH STATE—Continued.

PACIFIC-NORTHWEST—Continued.

Oregon.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
		2	*5*		*6*	*9*	*29*	*43*	*40*	*69*	*111*	*314*	
Total	100.0	22.4	13.8		6.6	6.0	10.7	7.9	3.8	3.3	2.2	76.7	23.3
Douglas fir	100.0	19.9	15.7		8.5	6.9	10.9	7.4	3.6	3.4	2.2	78.5	21.5
White pine Western pine	100.0	27.4	8.5		.....	4.1	9.5	8.9	4.3	2.7	2.2	67.6	32.4
Sugar pine	100.0	55.1	2.8		.....	1.8	4.6	5.5	3.7	2.7	1.8	78.0	22.0
Cedar	100.0	32.5	9.5		5.6	4.8	8.7	5.6	3.2	7.1	2.4	79.4	20.6
Hemlock	100.0	26.4	11.7		5.9	2.1	15.5	9.2	4.6	2.9	2.5	80.8	19.2
Spruce	100.0	12.9	7.9		6.9	7.9	9.9	14.9	5.9	2.0	2.0	70.3	29.7
All other species	100.0	11.9	20.2		3.6	4.7	13.1	11.9	1.2	2.4	2.4	71.4	28.6

Washington.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
		2		*3*		*8*	*19*	*34*	*46*	*84*	*99*	*295*	
Total	100.0	34.6	.....	8.8		7.3	8.6	7.7	5.6	5.1	2.8	80.5	19.5
Douglas fir	100.0	36.9	.....	7.7		7.3	9.3	7.1	5.4	4.9	2.7	81.3	18.7
White pine Western pine	100.0	36.4	.....	....		2.3	6.0	5.3	6.8	7.6	2.3	66.7	33.3
Cedar	100.0	26.8	.....	9.2		7.8	9.5	10.8	6.7	6.5	3.8	81.1	18.9
Hemlock	100.0	30.9	.....	16.7		10.6	5.2	7.9	4.8	3.6	2.1	81.8	18.2
Spruce	100.0	25.8	.....	15.7		5.6	11.3	10.1	5.6	5.6	3.4	83.1	16.9
All other species	100.0	39.3	.....	10.1		1.1	4.5	7.9	3.4	5.6	2.3	74.2	25.8

Idaho.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
		3				*3*		*4*	*9*	*8*	*9*	*36*	
Total	100.0	[1] 46.2			.....	11.9		6.0	5.9	3.2	1.4	74.6	25.4
Douglas fir	100.0	41.2			.....	11.8		9.8	5.9	2.0	1.9	72.6	27.4
White pine	100.0	55.4			.....	14.1		3.3	6.5	3.3	1.1	83.7	16.3
Western pine	100.0	39.8			.....	3.8		9.8	5.3	2.2	1.5	62.4	37.6
Cedar	100.0	45.7			.....	17.2		.....	5.7	5.7	.....	74.3	25.7
Hemlock Spruce All other species	100.0	40.6			.....	16.8		5.9	5.9	4.0	2.0	75.2	24.8

Montana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
		1		*5*						*6*		*12*	
Total	100.0	29.8	.....	[2] 49.5						2.8		82.1	17.9
Douglas fir	100.0	35.6	.....	48.9						2.2		86.7	13.3
White pine Western pine	100.0	25.6	.....	51.2						2.5		79.3	20.7
Cedar Spruce All other species	100.0	30.8	.....	48.3						3.3		82.4	17.6

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[1] Groups 1 and 3.

[2] Groups 3, 6. and 8.

TABLE 34.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF EACH SPECIES, BY SIZE GROUPS, IN PERCENTAGES OF THE TOTAL IN EACH STATE—Continued.

SOUTHERN PINE REGION.

Missouri (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
								3	*4*	*5*	*9*	*21*	
Total	100.0	.....	.....	.....	.....	.....	.....	21.2	15.1	9.1	7.1	52.5	47.5
Yellow pine	100.0	.....	.....	.....	.....	.....	.....	36.3	18.2	9.1	.....	63.6	36.4
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	100.0	.....	.....	.....	.....	.....	.....	36.3	18.2	9.1	.....	63.6	36.4
Cypress	100.0	.....	.....	.....	.....	.....	.....	22.2	22.2	11.1	11.1	66.6	33.4
Hardwoods	100.0	.....	.....	.....	.....	.....	.....	19.0	13.9	8.9	7.6	49.4	50.6

Arkansas.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
						7		*13*	*21*	*35*	*58*	*134*	
Total	100.0	.....	.....	.....	.....	14.1		10.3	9.8	7.8	6.2	48.2	51.8
Yellow pine	100.0	.....	.....	.....	.....	18.5		21.5	12.7	5.8	3.8	62.3	37.7
Longleaf	.....	.....	.....	.....	.....	.....		.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	100.0	.....	.....	.....	.....	18.5		21.5	12.7	5.8	3.8	62.3	37.7
Cypress	100.0	.....	.....	.....	.....	.....		4.5	13.6	4.6	9.1	31.8	68.2
Hardwoods	100.0	.....	.....	.....	.....	12.5		4.8	8.1	8.9	7.3	41.6	58.4

Texas.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
				3			*3*	*9*	*12*	*21*	*33*	*81*	
Total	100.0	.....	.....	[1]22.1			7.6	8.9	6.8	5.5	4.4	55.3	44.7
Yellow pine	100.0	.....	.....	31.4			10.9	11.4	8.2	6.5	3.8	72.2	27.8
Longleaf	100.0	.....	.....	54.5			10.7	11.6	4.0	2.7	3.1	86.6	13.4
Shortleaf and loblolly	100.0	.....	.....	8.5			11.1	11.1	12.4	10.2	4.5	57.8	42.2
Cypress	100.0	.....	.....	.....			.....	.....	.....	.....	.....	.....	100.0
Hardwoods	100.0	.....	.....	2.4			.5	3.8	3.8	3.4	5.7	19.6	80.4

Louisiana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
					10		*10*	*17*	*28*	*50*	*74*	*189*	
Total	100.0	.....	.....	.....	26.6		12.2	9.9	8.1	6.9	5.4	69.1	30.9
Yellow pine	100.0	.....	.....	.....	39.1		16.5	9.6	6.4	5.8	4.1	81.5	18.5
Longleaf	100.0	.....	.....	.....	39.6		19.0	11.4	6.7	4.8	2.9	84.4	15.6
Shortleaf and loblolly	100.0	.....	.....	.....	37.5		7.9	3.3	5.3	9.2	8.5	71.7	28.3
Cypress	100.0	.....	.....	.....	23.6		3.8	22.3	13.4	7.6	6.4	77.1	22.9
Hardwoods	100.0	.....	.....	.....	4.7		7.7	5.2	9.1	8.8	7.1	42.6	57.4

[1] Groups 3 and 5.

TABLE 34.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF EACH SPECIES, BY SIZE GROUPS, IN PERCENTAGES OF THE TOTAL IN EACH STATE—Continued.

SOUTHERN PINE REGION—Continued.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Mississippi.													
Total	100.0	....	....	....	*2* 8.8	*4* 9.6	*4* 6.4	*7* 4.7	*24* 8.7	*36* 6.5	*59* 5.5	*136* 50.2	49.8
Yellow pine	100.0	....	....	....	13.5	11.1	9.6	6.2	10.9	6.9	4.6	62.8	37.2
Longleaf	100.0	....	....	....	17.7	10.9	12.6	8.2	10.9	7.8	4.8	72.9	27.1
Shortleaf and loblolly	100.0	....	....	....	....	11.5	....	....	10.8	4.1	4.0	30.4	69.6
Cypress	100.0	....	....	....	....	26.3	....	....	5.2	15.8	5.3	52.6	47.4
Hardwoods	100.0	....	....	....	....	5.5	.3	1.9	4.5	5.2	7.1	24.5	75.5
Alabama.													
Total	100.0	....	....	....	....	....	*13* 16.3		*16* 9.6	*23* 7.3	*37* 5.3	*89* 38.5	61.5
Yellow pine	100.0	....	....	....	....	....	22.4		11.6	8.2	6.0	48.2	51.8
Longleaf	100.0	....	....	....	....	....	29.7		14.8	9.8	6.6	60.9	39.1
Shortleaf and loblolly	100.0	....	....	....	....	....	7.3		4.8	4.9	4.8	21.8	78.2
Cypress	100.0	....	....	....	....	....	....		....	50.0	....	50.0	50.0
Hardwoods	100.0	....	....	....	....	....	3.9		5.5	5.0	3.8	18.2	81.8
Florida.													
Total	100.0	....	....	....	....	*2* 8.1	*9* 17.5	*19* 17.6	*33* 15.4	*52* 12.2	*67* 8.0	*182* 78.8	21.2
Yellow pine	100.0	....	....	....	....	8.3	16.6	17.1	16.1	13.0	8.9	80.0	20.0
Longleaf	100.0	....	....	....	....	8.4	16.8	17.4	16.1	13.1	9.1	80.9	19.1
Shortleaf and loblolly	100.0	....	....	....	....	....	....	....	11.1	11.1	....	22.2	77 8
Cypress	100.0	....	....	....	....	10.3	24.3	23.3	14.0	10.3	4.7	86.9	13.1
Hardwoods	100.0	....	....	....	....	....	12.2	9.7	9.8	4.9	2.4	39.0	61.0
Georgia (part).													
Total	100.0	....	....	....	....	*2* 7.0		....	*9* 6.3	*12* 4.1	*31* 6.3	*54* 23.7	76.3
Yellow pine	100.0	....	....	....	....	3.8		....	6.6	4.1	7.0	21.5	78.5
Longleaf	100.0	....	....	....	....	6.5		....	10.3	7.0	9.7	33.5	66.5
Shortleaf and loblolly	100.0	....	....	....	....	....		....	1.5	....	3.0	4.5	95.5
Cypress	100.0	....	....	....	....	50.0		....	7.1	10.7	14.3	82.1	17.9
Hardwoods	100.0	....	....	....	....	5.3		....	5.2	2.6	2.6	15.7	84.3

TABLE 34.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF EACH SPECIES, BY SIZE GROUPS, IN PERCENTAGES OF THE TOTAL IN EACH STATE—Continued.

SOUTHERN PINE REGION—Continued.

South Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	.....	*5* [1]17.6			*8* 8.8	*14* 7.8	*32* 8.8	*59* 43.0	57.0
Yellow pine	100.0	.....	.....	.....	.....	20.8			10.9	6.3	7.8	45.8	54.2
Longleaf	100.0	.....	.....	.....	.....	10.9			4.4	6.5	6.5	28.3	71.7
Shortleaf and loblolly	100.0	.....	.....	.....	.....	24.0			13.0	6.2	8.2	51.4	48.6
Cypress	100.0	.....	.....	.....	.....	15.4			7.7	23.1	11.5	57.7	42.3
Hardwoods	100.0	.....	.....	.....	.....	11.2			4.5	6.8	10.1	32.6	67.4

North Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	*8* [2]22.4				*9* 7.5	*21* 8.1	*25* 4.9	*63* 42.9	57.1
Yellow pine	100.0	.....	.....	.....	19.1				10.1	9.8	5.9	44.9	55.1
Longleaf	100.0	.....	.....	.....	....				3.5	3.4	3.4	10.3	89.7
Shortleaf and loblolly	100.0	.....	.....	.....	21.6				11.0	10.6	6.2	49.4	50.6
Cypress	100.0	.....	.....	.....	40.0				3.3	3.3	3.4	50.0	50.0
Hardwoods	100.0	.....	.....	.....	24.5				3.5	6.3	3.5	37.8	62.2

Virginia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	.....	.....	*2* 13.1		*2* 4.8	*2* 2.1	*9* 5.5	*15* 25.5	74.5
Yellow pine	100.0	.....	.....	.....	.....	.....	19.5		3.5	2.3	5.7	31.0	69.0
Longleaf	.....	.....	.....	.....	.....	.....	.....		.....	.....	.....	.....	.....
Shortleaf and loblolly	100.0	.....	.....	.....	.....	.....	19.5		3.5	2.3	5.7	31.0	69.0
Cypress	100.0	.....	.....	.....	.....	.....	.....		50.0	.....	.....	50.0	50.0
Hardwoods	100.0	.....	.....	.....	.....	.....	3.6		5.3	1.8	5.4	16.1	83.9

LAKE STATES.

Michigan.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	*12* [2]27.7				*21* 15.5	*36* 14.3	*41* 8.0	*110* 65.5	34.5
White and Norway pine	100.0	.....	.....	.....	35.0				10.0	20.0	15.0	80.0	20.0
Hemlock	100.0	.....	.....	.....	22.7				18.0	18.7	9.3	68.7	31.3
Other conifers	100.0	.....	.....	.....	21.2				9.6	9.6	7.7	48.1	51.9
Hardwoods	100.0	.....	.....	.....	31.5				15.7	12.2	6.7	66.1	33.9

[1] Groups 5 and 7.

[2] Groups 4, 6, and 7.

TABLE 34.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF EACH SPECIES, BY SIZE GROUPS, **IN PERCENTAGES** OF THE TOTAL IN EACH STATE—Continued.

LAKE STATES—Continued.

Wisconsin.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
							10		*18*	*34*	*34*	*96*	
Total	100.0	.....	.....	.....	.....	.....	24.0		21.9	19.8	9.6	75.3	24.7
White and Norway pine	100.0	.....	.....	.....	.....	.....	28.1		31.2	18.8	9.4	87.5	12.5
Hemlock	100.0	.....	.....	.....	.....	.....	25.8		23.3	23.3	9.5	81.9	18.1
Other conifers	100.0	.....	.....	.....	.....	.....	17.4		13.1	13.0	13.0	56.5	43.5
Hardwoods	100.0	.....	.....	.....	.....	.....	22.3		19.8	18.2	9.1	69.4	30.6

Minnesota.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
					6				*4*	*8*	*14*	*32*	
Total	100.0	.....	.....	.....	[1]34.0				6.5	5.2	5.6	51.3	48.7
White and Norway pine	100.0	.....	.....	.....	54.4				9.6	5.6	8.0	77.6	22.4
Hemlock	.....	.....	.....	.....	.....				.....	.....	.....	.....	.....
Other conifers	100.0	.....	.....	.....	15.9				1.6	6.3	3.2	27.0	73.0
Hardwoods	100.0	.....	.....	.....	2.3				4.5	2.3	2.3	11.4	88.6

TABLE 35.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, **IN PERCENTAGES** OF THE TOTAL IN EACH GROUP.

[Percentages computed from Table 33. See note at head of Table 33.]

PACIFIC-NORTHWEST.

California.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	100.0			100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	18.2	18.5			24.2	15.7	8.4	8.0	12.9	12.5	10.5	16.6	26.8
Western pine	24.6	31.4			17.2	4.7	15.6	23.9	12.9	12.5	31.6	22.8	34.5
Sugar pine	9.6	9.4			7.3	2.8	11.6	16.0	8.1	6.2	13.1	9.0	12.9
Redwood	41.1	35.1			48.7	72.8	55.1	36.8	56.5	66.7	39.5	45.4	17.8
Cedar	1.4	.8			2.0	1.6	.9	2.5	1.6	.....	.....	1.2	2.3
Spruce	.5	.1			.6	.....	1.3	1.8	1.6	.....	.....	.5	.5
All other species	4.6	4.7			.....	2.4	7.1	11.0	6.4	2.1	5.3	4.5	5.2

Oregon.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	68.7	61.0	78.5		88.2	79.3	69.6	64.3	66.2	70.5	68.5	70.3	63.3
White pine	.1	.....	.....		.....	.....	.....	.....	.....	.....	1.1	([2])	.1
Western pine	14.7	18.0	9.1		.....	10.1	13.1	16.6	16.6	12.1	13.5	13.0	20.4
Sugar pine	2.7	6.7	.5		.....	.9	1.2	1.9	2.6	2.3	2.3	2.8	2.6
Cedar	3.2	4.6	2.2		2.7	2.5	2.6	2.2	2.6	6.8	3.4	3.3	2.8
Hemlock	6.0	7.1	5.1		5.3	2.1	8.6	7.0	7.3	5.3	6.7	6.3	5.0
Spruce	2.5	1.5	1.5		2.7	3.4	2.3	4.8	4.0	1.5	2.3	2.3	3.2
All other species	2.1	1.1	3.1		1.1	1.7	2.6	3.2	.7	1.5	2.2	2.0	2.6

[1] Groups 4, 6, and 7.

[2] Less than one-tenth of 1 per cent.

TABLE 35.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES OF THE TOTAL IN EACH GROUP—Continued.

PACIFIC-NORTHWEST—Continued.

Washington.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	100.0	.....	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	65.7	69.9	.....	56.9		66.0	70.7	60.8	64.4	62.9	64.6	66.4	63.1
White pine	.2	.2	.....	....		.....	.4	.....	.....	.7	1.2	.2	.3
Western pine	4.3	4.5	.....	....		1.4	2.8	3.1	5.5	6.0	2.4	3.5	7.3
Cedar	12.6	9.7	.....	13.1		13.5	13.8	17.6	15.3	15.9	17.1	12.6	12.2
Hemlock	11.2	10.0	.....	21.1		16.3	6.7	11.4	9.8	7.9	8.5	11.4	10.5
Spruce	3.0	2.3	.....	5.4		2.3	4.0	4.0	3.1	3.3	3.7	3.1	2.6
All other species	3.0	3.4	.....	3.5		.5	1.6	3.1	1.9	3.3	2.5	2.8	4.0

Idaho.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	[1] 100.0			.....	100.0		100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	10.1	9.0			.....	10.0		16.7	10.0	6.3	14.3	9.8	10.9
White pine	36.5	43.8			.....	43.3		20.0	40.0	37.5	28.6	41.0	23.4
Western pine	26.4	22.7			.....	8.3		43.3	23.3	18.7	28.6	22.1	39.1
Cedar	6.9	6.9			.....	10.0		.....	6.7	12.5	.....	6.9	7.0
Hemlock	1.0	1.7			.....	....		.....	3.3	.....	.....	1.3	.....
Spruce	1.0	.4			.....	1.7		.....	.....	6.2	.....	.8	1.6
All other species	18.1	15.5			.....	26.7		20.0	16.7	18.8	28.5	18.1	18.0

Montana.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	100.0	.....	[2] 100.0						100.0		100.0	100.0
Douglas fir	20.7	24.6	.....	20.4						16.7		21.8	15.4
White pine	1.4	.....	.....	1.9						....		1.1	2.6
Western pine	36.2	32.3	.....	37.0						33.3		35.2	41.0
Cedar	.9	.....	.....	1.8						....		1.1	.....
Spruce	5.5	13.9	.....	.9						....		5.6	5.1
All other species	35.3	29.2	.....	38.0						50.0		35.2	35.9

SOUTHERN PINE REGION.

Missouri (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	.....	.....	.....	.....	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	11.1	.....	.....	.....	.....	.....	.....	19.1	13.4	11.1	.....	13.5	8.5
Longleaf	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shortleaf and loblolly	11.1	.....	.....	.....	.....	.....	.....	19.1	13.4	11.1	.....	13.5	8.5
Cypress	9.1	.....	.....	.....	.....	.....	.....	9.5	13.3	11.1	14.3	11.5	6.4
Hardwoods	79.8	.....	.....	.....	.....	.....	.....	71.4	73.3	77.8	85.7	75.0	85.1

[1] Groups 1 and 3.

[2] Groups 3, 6, and 8.

TABLE 35.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES OF THE TOTAL IN EACH GROUP—Continued.

SOUTHERN PINE REGION—Continued.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Arkansas.													
Total	100.0	.....	.....	.....	.....	100.0		100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	33.0	.....	.....	.....	.....	43.2		69.2	42.9	24.6	20.4	42.7	24.0
Longleaf	......	.....	.....	.....	.....	.....	......	.....	.....	.....	.....	....	.....
Shortleaf and loblolly	33.0	.....	.....	.....	.....	43.2		69.2	42.9	24.6	20.4	42.7	24.0
Cypress	2.8	.....	.....	.....	.....	.....	....	1.2	3.9	1.6	4.1	1.9	3.7
Hardwoods	64.2	.....	.....	.....	.....	56.8		29.6	53.2	73.8	75.5	55.4	72.3
Texas.													
Total	100.0	.....	.....	[1] 100.0			100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	68.0	.....	.....	96.6			98.0	86.4	82.2	80.6	58.6	88.8	42.4
Longleaf	33.9	.....	.....	83.6			48.0	44.0	20.0	16.7	24.1	53.2	10.2
Shortleaf and loblolly	34.1	.....	.....	13.0			50.0	42.4	62.2	63.9	34.5	35.6	32.2
Cypress	.3	.....	.....	......	......	......	.....	.....	.....	.....	.....	....	.7
Hardwoods	31.7	.....	.....	3.4			2.0	13.6	17.8	19.4	41.4	11.2	56.9
Louisiana.													
Total	100.0	.....	.....	.....	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	56.5	.....	.....	.....	83.1		76.7	54.6	44.3	47.0	43.8	66.7	33.8
Longleaf	43.8	.....	.....	.....	65.2		68.5	50.4	36.1	30.1	23.5	53.5	22.2
Shortleaf and loblolly	12.7	.....	.....	.....	17.9		8.2	4.2	8.2	16.9	20.3	13.2	11.6
Cypress	13.1	.....	.....	.....	11.6		4.1	29.4	21.7	14.5	15.6	14.6	9.7
Hardwoods	30.4	.....	.....	.....	5.3		19.2	16.0	34.0	38.5	40.6	18.7	56.5
Mississippi.													
Total	100.0	.....	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	65.5	.....	.....	.....	100.0	75.8	98.4	86.7	81.9	69.4	55.8	82.0	48.8
Longleaf	50.0	.....	.....	.....	100.0	57.1	98.4	86.7	62.6	59.7	44.2	72.6	27.1
Shortleaf and loblolly	15.5	.....	.....	.....	.....	18.7	.....	.....	19.3	9.7	11.6	9.4	21.7
Cypress	2.0	.....	.....	.....	.....	5.5	.....	.....	1.2	4.8	1.9	2.1	1.9
Hardwoods	32.5	.....	.....	.....	.....	18.7	1.6	13.3	16.9	25.8	42.3	15.9	49.3
Alabama.													
Total	100.0	.....	.....	.....	.....	.....	100.0		100.0	100.0	100.0	100.0	100.0
Yellow pine	67.5	.....	.....	.....	.....	.....	92.4		81.5	75.6	76.7	84.3	56.9
Longleaf	45.5	.....	.....	.....	.....	.....	82.6		70.4	61.0	56.7	71.9	28.9
Shortleaf and loblolly	22.0	.....	.....	.....	.....	.....	9.8		11.1	14.6	20.0	12.4	28.0
Cypress	.4	.....	.....	.....	.....	.....	.....	......	.....	2.4	.....	.5	.3
Hardwoods	32.1	.....	.....	.....	.....	.....	7.6		18.5	22.0	23.3	15.2	42.8

[1] Groups 3 and 5.

TABLE 35.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES OF THE TOTAL IN EACH GROUP—Continued.

SOUTHERN PINE REGION—Continued.

Florida.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Yellow pine	80.0	.....	.....	.....	.....	81.7	76.0	77.7	83.3	85.6	89.8	81.3	75.2
Longleaf	78.8	.....	.....	.....	.....	81.7	76.0	77.7	82.4	84.5	89.8	80.9	70.7
Shortleaf and loblolly	1.2	.....	.....	.....	.....	.....	.....	.....	.9	1.1	.....	.4	4.5
Cypress	14.5	.....	.....	.....	.....	18.3	20.1	19.2	13.2	12.2	8.5	16.0	8.9
Hardwoods	5.5	.....	.....	.....	.....	.....	3.9	3.1	3.5	2.2	1.7	2.7	15.9

Georgia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	.....	100.0		.....	100.0	100.0	100.0	100.0	100.0
Yellow pine	68.9	.....	.....	.....	.....	37.5		.....	72.4	68.4	75.9	62.4	71.0
Longleaf	40.2	.....	.....	.....	.....	37.5		.....	65.5	68.4	62.1	56.9	35.1
Shortleaf and loblolly	28.7	.....	.....	.....	.....	.....		.....	6.9	.....	13.8	5.5	35.9
Cypress	6.1	.....	.....	.....	.....	43.8		.....	6.9	15.8	13.8	21.1	1.4
Hardwoods	25.0	.....	.....	.....	.....	18.7		.....	20.7	15.8	10.3	16.5	27.6

South Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	.....	[1]100.0			100.0	100.0	100.0	100.0	100.0
Yellow pine	62.5	.....	.....	.....	.....	74.1			77.8	50.0	55.6	66.7	59.4
Longleaf	15.0	.....	.....	.....	.....	9.3			7.4	12.5	11.1	9.9	18.8
Short leaf and loblolly	47.5	.....	.....	.....	.....	64.8			70.4	37.5	44.5	56.8	40.6
Cypress	8.5	.....	.....	.....	.....	7.4			7.4	25.0	11.1	11.3	6.3
Hardwoods	29.0	.....	.....	.....	.....	18.5			14.8	25.0	33.3	22.0	34.3

North Carolina (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	[2]100.0				100.0	100.0	100.0	100.0	100.0
Yellow pine	59.7	.....	.....	.....	51.0				81.3	71.4	71.4	62.5	57.6
Longleaf	6.8	.....	.....	.....	.....				3.1	2.8	4.7	1.6	10.6
Shortleaf and loblolly	52.9	.....	.....	.....	51.0				78.2	68.6	66.7	60.9	47.0
Cypress	7.0	.....	.....	.....	12.5				3.1	2.9	4.8	8.2	6.1
Hardwoods	33.3	.....	.....	.....	36.5				15.6	25.7	23.8	29.3	36.3

Virginia (part).

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	.....	.....	100.0		100.0	100.0	100.0	100.0	100.0
Yellow pine	60.0	.....	.....	.....	.....	.....	89.5		42.9	66.7	62.5	73.0	55.6
Longleaf	.....	.....	.....	.....	.....	.....	.....		.....	.....	.....	.....	.....
Shortleaf and loblolly	60.0	.....	.....	.....	.....	.....	89.5		42.9	66.7	62.5	73.0	55.6
Cypress	1.4	.....	.....	.....	.....	.....	.....		14.3	.....	.....	2.7	.9
Hardwoods	38.6	.....	.....	.....	.....	.....	10.5		42.8	33.3	37.5	24.3	43.5

[1] Groups 5 and 7.

[2] Groups 4, 6, and 7.

TABLE 35.—HOLDINGS OF STANDING TIMBER IN EACH STATE: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES OF THE TOTAL IN EACH GROUP—Continued.

LAKE STATES.

Michigan.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	[1] 100.0				100.0	100.0	100.0	100.0	100.0
White and Norway pine	4.2	.....	.....	.....	5.3				2.7	5.9	7.9	5.1	2.4
Hemlock	31.5	.....	.....	.....	25.8				36.5	41.2	36.9	33.0	28.7
Other conifers	10.9	.....	.....	.....	8.3				6.8	7.3	10.5	8.0	16.5
Hardwoods	53.4	.....	.....	.....	60.6				54.0	45.6	44.7	53.9	52.4

Wisconsin.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	.....	.....	100.0		100.0	100.0	100.0	100.0	100.0
White and Norway pine	11.0	.....	.....	.....	.....	.....	12.8		15.6	10.3	10.7	12.7	5.5
Hemlock	39.7	.....	.....	.....	.....	.....	42.9		42.2	46.6	39.3	43.2	29.2
Other conifers	7.9	.....	.....	.....	.....	.....	5.7		4.7	5.2	10.7	5.9	13.9
Hardwoods	41.4	.....	.....	.....	.....	.....	38.6		37.5	37.9	39.3	38.2	51.4

Minnesota.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	.....	.....	.....	[1] 100.0				100.0	100.0	100.0	100.0	100.0
White and Norway pine	53.9	.....	.....	.....	86.1				80.0	58.3	76.9	81.5	24.8
Hemlock	.....	.....	.....	.....	.....				.....	.....	.....	.....	.....
Other conifers	27.1	.....	.....	.....	12.6				6.7	33.3	15.4	14.3	40.7
Hardwoods	19.0	.....	.....	.....	1.3				13.3	8.4	7.7	4.2	34.5

[1] Groups 4, 6, and 7.

The Southern Pacific owns 14.1 per cent of the privately owned timber in California, and it, together with the 6 holders in groups 2 and 3, owns 40.4 per cent. The 14 largest holdings in California contain 52.6 per cent of the privately owned timber in that State, 23 holdings contain 62.8 per cent, 39 contain 71.9 per cent, and 62 holdings contain 78.5 per cent. The holdings of the Southern Pacific, the Weyerhaeuser Timber Company, and the 5 owners in groups 2 and 3, contain 36.2 per cent of the privately owned timber in Oregon. The holdings of the Weyerhaeuser Timber Company, the Northern Pacific, and the 3 owners in groups 3 and 4 contain 43.4 per cent of the privately owned timber in Washington. The Northern Pacific and 2 holders in group 3 own 46.2 per cent of the privately owned timber in Idaho. The Northern Pacific and the Amalgamated Copper Company, together with 4 relatively small holders in groups 3, 6, and 8, own 79.3 per cent of the privately owned timber in Montana.

In Arkansas 7 holders own 18.5 per cent of the shortleaf and loblolly pine and 12.5 per cent of the hardwoods.

In Texas, 3 holders have 22.1 per cent of all the timber and 54.5 per cent of the longleaf pine. The 15 holders in groups 3, 5, 6, and 7 own 76.8 per cent of the longleaf, 30.7 per cent of the shortleaf and loblolly, and 6.7 per cent of the hardwoods.

In Louisiana 37 holders in groups 4 to 7 own 48.7 per cent of the total timber, 70 per cent of the longleaf pine, 48.7 per cent of the shortleaf and loblolly, 49.7 per cent of the cypress, and 17.6 per cent of the hardwoods.

In Mississippi, 2 holders have 17.7 per cent of the longleaf. The 10 holders in groups 4 to 6 have 24.8 per cent of the total timber, 41.2 per cent of the longleaf pine, 11.5 per cent of the shortleaf and loblolly, and 5.8 per cent of the hardwoods.

In Alabama, 13 holders in groups 6 and 7 have 29.7 per cent of the longleaf pine, 7.3 per cent of the shortleaf and loblolly, and 3.9 per cent of the hardwoods.

In Florida, 30 holders have 43.2 per cent of the total timber, 42.6 per cent of the longleaf pine, 57.9 per cent of the cypress, and 21.9 per cent of the hardwoods.

In Georgia, 2 holders have 7 per cent of all the timber; in South Carolina, 5 holders have 17.6 per cent of all the timber; in North Carolina, 8 holders have 22.4 per cent of all the timber; and in Virginia, 2 holders have 13.1 per cent.

The 12 holdings in groups 4, 6, and 7 contain 27.7 per cent of all the timber in Michigan. The 10 holdings in groups 6 and 7 contain 24 per cent of all the privately owned timber in Wisconsin, and these, together with the 18 holdings in group 8, contain 45.9 per cent. The 6 holdings in groups 4, 6, and 7 contain 34.0 per cent of the privately owned timber in Minnesota, 54.4 per cent of the white and Norway pine, 15.9 per cent of the other conifers, and 2.3 per cent of the hardwoods. The 32 holdings in groups 4 to 10 contain 77.6 per cent of the white and Norway pine, 27.0 per cent of the other conifers, and 11.4 per cent of the hardwoods.

REDWOOD.—Nearly all of this species is in a long narrow belt with an enormous stand per acre. The ownership of it is very highly concentrated, as shown by the following table, in which only redwood is considered and the holdings of that timber are grouped without regard to the amounts of other species owned by the same holders—that is, to come within group 3 a holder must have over 5 billion feet of redwood and not merely 5 billion feet of all timber. This explains why there are no figures in the columns for groups 1 and 2 here, although in some other tables figures for redwood were given for these groups. To come within group 2 a holding must exceed 13 billion feet. No single holding contains that amount of redwood, though there are redwood owners whose total holdings of all timber surpass that size, and therefore fall in group 2 or group 1 when total timber is the basis of classification.

TABLE 36.—HOLDINGS OF REDWOOD IN CALIFORNIA, GROUPED BY SIZE.

[In billions of board feet. Thus, 101.9=101,900,000,000 board feet. This table differs from the redwood line shown under California in Table 33, in that each holding which contains redwood is here grouped according to the amount of redwood therein, while in Table 33 each holding is grouped according to the total amount of timber of all species therein.]

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
				4	*2*	*9*	*9*	*11*	*12*	*24*	*19*	*90*	
Amount of redwood...........	101.9	.....	.....	31.0	8.5	24.0	14.0	7.3	4.1	4.2	1.7	94.8	7.1
Percentage in each group......	100.0	.....	.....	30.4	8.3	23.6	13.7	7.2	4.0	4.1	1.7	93.0	7.0

Four holders having each more than 5 billion feet of redwood own 30 per cent of the total supply of that species, 15 holders own 62 per cent, and 24 holders own over three-fourths.

The ownership of timber and land in the great redwood belt will be more fully discussed in another Part of this Report.

CYPRESS.—A similar condition exists in the ownership of cypress.

Fourteen holders having each more than 250 million feet of cypress in Louisiana own about three-fifths of the cypress in that State, 7 having each more than 500 million own two-fifths, and one owns more than 15 per cent.

Eleven holders having each more than 250 million feet of cypress in Florida own half the cypress in that State, and 5 having each more than 500 million own three-tenths.

OREGON AND WASHINGTON, WEST OF THE CASCADES.—Tables 37 and 38, based on a classification of holdings according to the amount of timber belonging to each in western Oregon and in western Washington, respectively (see p. 156), will be especially valuable to persons interested in the local timber situation in those regions. In Table 37 the timber west of the Cascades in Oregon is classified by size of holding in that area. Thus, the column headed " Group 4 " shows that 6 holders have each between 3½ and 5 billion feet in Oregon west of the Cascades, and that the total of these 6 holdings in that area is 26.3 billion feet.

TABLE 37.—HOLDINGS OF STANDING TIMBER IN WESTERN OREGON, CLASSIFIED BY SIZE AND BY SPECIES.

[In billions of board feet. Thus, 348.5=348,500,000,000 board feet. This table differs from the Oregon section in Table 33 in that the holdings are here grouped according to their size in western Oregon instead of according to their size in the State. See p. 94 for a description of the groups. The number of holdings in each group is shown in italics.]

	Total.	Group 1.	Group 2. Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
		2	*5*	*6*	*8*	*24*	*37*	*37*	*65*	*97*	*281*	
Total........	348.5	82.9	49.4	26.3	21.0	34.7	26.8	13.6	11.3	7.8	273.8	74.7
Douglas fir..........	269.7	53.9	42.9	23.2	18.7	28.0	20.7	10.4	8.7	6.0	212.5	57.2
White pine.........	.2	......	......	......	......	......	......	......	......	.1	.1	.1
Western pine......	17.5	11.1	.4	......	......	.1	.5	.6	.4	.2	13.3	4.2
Sugar pine.........	9.3	5.5	.2	......	.1	.1	.5	.3	.3	.2	7.2	2.1
Cedar..............	12.2	4.1	1.1	.7	.5	1.0	.6	.5	.9	.3	9.7	2.5
Hemlock...........	23.8	6.3	2.8	1.4	.5	3.6	2.2	1.1	.6	.7	19.2	4.6
Spruce.............	10.1	1.3	.8	.7	.8	.9	1.7	.6	.2	.2	7.2	2.9
All other species...	5.7	.7	1.2	.3	.4	1.0	.6	.1	.2	.1	4.6	1.1

In Table 38 the holdings in Washington west of the Cascades are classified without regard to timber owned by the same holders elsewhere, just as those of western Oregon are in Table 37.

TABLE 38.—HOLDINGS OF STANDING TIMBER IN WESTERN WASHINGTON, CLASSIFIED BY SIZE AND BY SPECIES.

[In billions of board feet. Thus, 270.5=270,500,000,000 board feet. This table differs from the Washington section in Table 33 in that the holdings are here grouped according to their size in western Washington instead of according to their size in the State. See p. 94 for a description of the groups. The number of holdings in each group is shown in italics.]

	Total.	Group 1.	Group 2.	Group 3. Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
		2		*3*	*7*	*19*	*32*	*44*	*76*	*95*	*278*	
Total........	270.5	93.1	......	26.0	19.4	26.0	21.5	15.5	13.2	7.9	222.6	47.9
Douglas fir..........	186.1	68.6	......	14.8	12.8	19.2	13.5	10.5	8.9	5.4	153.7	32.4
Western pine......	.2	.1	......	......	......	.1	......	......	......	......	.2	......
Cedar..............	36.4	9.5	......	3.4	2.8	3.5	4.0	2.6	2.3	1.4	29.5	6.9
Hemlock..........	32.8	10.0	......	5.5	3.2	1.9	2.7	1.7	1.2	.7	26.9	5.9
Spruce.............	8.6	2.1	......	1.4	.5	1.0	.8	.5	.5	.3	7.1	1.5
All other species....	6.4	2.8	......	.9	.1	.3	.5	.2	.3	.1	5.2	1.2

Section 10. Concentration of ownership on the Pacific slope.

California and the parts of Oregon and Washington lying west of the Cascades contain 867 billion feet of privately owned timber (see Table 9), or about half the privately owned timber in the investigation area. Broadly speaking, this is a region of enormous stands per acre and exceedingly high concentration of ownership. The separate treatment of this region—called here the Pacific slope—is of special interest. Table 39 classifies the holdings according to size in this region, as Table 26 does for the investigation area. The table includes all privately owned timber in California and the parts of Oregon and Washington lying west of the Cascades. The portions of Oregon and Washington east and west of the Cascades are defined on page 71, and the amount of timber lying east of the Cascades is given in Table 9.

TABLE 39.—HOLDINGS OF STANDING TIMBER ON THE PACIFIC SLOPE, CLASSIFIED BY SIZE AND BY SPECIES.

[In billions of board feet. Thus, 211.2=211,200,000,000 board feet. Each holding is grouped according to its total on the Pacific slope. See p. 94 for description of the groups. The number of timber holdings in each group is shown in italics. The Pacific slope covers all of California and the portions of Oregon and Washington lying west of the Cascades.]

PACIFIC SLOPE.

Total.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	867.1	*3* 211.2	*5* 97.8	*8* 58.4	*13* 55.9	*25* 68.2	*59* 83.8	*77* 54.4	*90* 31.7	*157* 27.1	*209* 17.2	*646* 705.7	161.4
Douglas fir	501.0	176.2		31.2	30.3	38.9	47.5	29.8	19.5	17.3	10.3	401.0	100.0
White pine	.2	....		....	....	....	....	....	....	....	.1	.1	.1
Western pine	78.9	42.4		2.7	3.3	1.6	4.2	3.8	1.4	.6	1.3	61.3	17.6
Sugar pine	33.1	15.0		.9	1.3	1.2	3.2	2.5	1.0	.3	.6	26.0	7.1
Redwood	101.9	20.6		17.8	13.9	16.7	13.7	4.9	3.0	2.9	1.5	95.0	6.9
Cedar	52.0	16.9		2.5	2.0	3.7	4.8	4.5	2.9	2.9	1.5	41.7	10.3
Hemlock	56.6	23.3		1.8	3.4	3.0	5.4	4.0	2.2	1.9	1.1	46.1	10.5
Spruce	19.9	5.2		.3	1.4	1.7	2.1	2.3	1.2	.6	.5	15.3	4.6
All other species	23.5	9.4		1.2	.3	1.4	2.9	2.6	.5	.6	.3	19.2	4.3

California.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	248.1	35.2	49.0	24.9	24.0	24.4	25.0	13.7	5.6	4.0	3.5	209.3	38.8
Douglas fir	45.2	18.4		2.6	5.1	3.9	2.0	1.2	.8	.5	.3	34.8	10.4
Western pine	61.2	30.7		2.7	3.3	1.6	3.9	3.4	.7	.4	1.1	47.8	13.4
Sugar pine	23.8	9.3		.9	1.3	1.0	3.1	2.1	.6	.1	.4	18.8	5.0
Redwood	101.9	20.6		17.8	13.9	16.7	13.7	4.9	3.0	2.9	1.5	95.0	6.9
Cedar	3.4	.8		.3	.4	.4	.2	.3	.1	....	....	2.5	.9
Spruce	1.2	.1		.2	....	.1	.3	.1	.1	....	.1	1.0	.2
All other species	11.4	4.3		.4	....	.7	1.8	1.7	.3	.1	.1	9.4	2.0

TABLE 39.—HOLDINGS OF STANDING TIMBER ON THE PACIFIC SLOPE, CLASSIFIED BY SIZE AND BY SPECIES—Continued.

PACIFIC SLOPE—Continued.

Western Oregon.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	348.5	82.9	34.0	21.7	23.8	26.4	33.3	20.7	13.3	10.7	7.0	273.8	74.7
Douglas fir	269.7	53.9	29.1	18.8	21.0	22.7	27.4	15.8	10.0	8.4	5.4	212.5	57.2
White pine	.2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.1	.1	.1
Western pine	17.5	11.1	.5	.....	.....	.....	.2	.4	.7	.2	.2	13.3	4.2
Sugar pine	9.3	5.5	.2	.....	.....	.2	.1	.4	.4	.2	.2	7.2	2.1
Cedar	12.2	4.1	.8	.8	.4	.8	.8	.5	.4	.8	.3	9.7	2.5
Hemlock	23.8	6.3	1.9	1.3	1.4	1.1	3.2	1.7	1.1	.7	.5	19.2	4.6
Spruce	10.1	1.3	.8	.....	.8	1.0	.9	1.4	.6	.2	.2	7.2	2.9
All other species	5.7	.7	.7	.8	.2	.6	.7	.5	.1	.2	.1	4.6	1.1
Western Washington.													
Total	270.5	93.1	14.8	11.8	8.1	17.4	25.5	20.0	12.8	12.4	6.7	222.6	47.9
Douglas fir	186.1	68.6	6.2	9.8	4.2	12.3	18.1	12.8	8.7	8.4	4.6	153.7	32.4
Western pine	.2	.1	.....	.....	.....	.....	.1	.....	.....	.....	.....	.2	.....
Cedar	36.4	9.5	1.7	1.4	1.2	2.5	3.8	3.7	2.4	2.1	1.2	29.5	6.9
Hemlock	32.8	10.0	5.1	.5	2.0	1.9	2.2	2.3	1.1	1.2	.6	26.9	5.9
Spruce	8.6	2.1	.9	.1	.6	.6	.9	.8	.5	.4	.2	7.1	1.5
All other species	6.4	2.8	.9	.....	.1	.1	.4	.4	.1	.3	.1	5.2	1.2

In Table 40 the above holdings are expressed in percentages, by groups and by species.

TABLE 40.—HOLDINGS OF STANDING TIMBER ON THE PACIFIC SLOPE: DISTRIBUTION OF EACH SPECIES BY SIZE GROUPS, IN PERCENTAGES.

[Percentages computed from Table 39. See note at head of Table 39.]

PACIFIC SLOPE.

Total.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
		3	*5*	*8*	*13*	*25*	*59*	*77*	*90*	*157*	*209*	*646*	
Total	100.0	24.4	11.3	6.7	6.4	7.9	9.7	6.3	3.6	3.1	2.0	81.4	18.6
Douglas fir	100.0	35.2		6.2	6.0	7.8	9.5	5.9	3.9	3.4	2.1	80.0	20.0
White pine Western pine	100.0	53.6		3.4	4.2	2.0	5.3	4.8	1.8	.7	1.8	77.6	22.4
Sugar pine	100.0	45.3		2.7	3.9	3.6	9.7	7.6	3.0	.9	1.8	78.5	21.5
Redwood	100.0	20.2		17.5	13.6	16.4	13.4	4.8	2.9	2.9	1.5	93.2	6.8
Cedar	100.0	32.5		4.8	3.8	7.1	9.2	8.7	5.6	5.6	2.9	80.2	19.8
Hemlock	100.0	41.2		3.2	6.0	5.3	9.5	7.1	3.9	3.4	1.9	81.5	18.5
Spruce	100.0	26.2		1.5	7.0	8.5	10.6	11.6	6.0	3.0	2.5	76.9	23.1
All other species	100.0	40.0		5.1	1.3	6.0	12.3	11.1	2.1	2.5	1.3	81.7	18.3

TABLE 40.—HOLDINGS OF STANDING TIMBER ON THE PACIFIC SLOPE: DISTRIBUTION OF EACH SPECIES BY SIZE GROUPS, IN PERCENTAGES—Continued.

PACIFIC SLOPE—Continued.

California.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	14.2	19.8	10.0	9.7	9.8	10.1	5.5	2.3	1.6	1.4	84.4	15.6
Douglas fir	100.0	40.7		5.7	11.3	8.6	4.4	2.7	1.8	1.1	.7	77.0	23.0
Western pine	100.0	50.2		4.4	5.4	2.6	6.4	5.6	1.1	.6	1.8	78.1	21.9
Sugar pine	100.0	39.1		3.8	5.5	4.2	13.0	8.8	2.5	.4	1.7	79.0	21.0
Redwood	100.0	20.2		17.5	13.6	16.4	13.4	4.8	2.9	2.9	1.5	93.2	6.8
Cedar	100.0	23.5		8.8	11.8	11.8	5.9	8.8	2.9	.....	.....	73.5	26.5
Spruce All other species	100.0	34.9		4.8	.....	6.3	16.7	14.3	3.2	.8	1.6	82.6	17.4

Western Oregon.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	23.8	9.8	6.2	6.8	7.6	9.6	5.9	3.8	3.1	2.0	78.6	21.4
Douglas fir	100.0	20.0	10.8	7.0	7.8	8.4	10.2	5.8	3.7	3.1	2.0	78.8	21.2
White pine Western pine	100.0	62.7	2.8	.....	.....	.....	1.1	2.3	4.0	1.1	1.7	75.7	24.3
Sugar pine	100.0	59.1	2.1	.....	.....	2.2	1.1	4.3	4.3	2.1	2.2	77.4	22.6
Cedar	100.0	33.6	6.5	6.5	3.3	6.5	6.6	4.1	3.3	6.6	2.5	79.5	20.5
Hemlock	100.0	26.5	8.0	5.5	5.9	4.6	13.5	7.1	4.6	2.9	2.1	80.7	19.3
Spruce	100.0	12.9	7.9	.....	7.9	9.9	8.9	13.9	5.9	2.0	2.0	71.3	28.7
All other species	100.0	12.3	12.3	14.0	3.5	10.5	12.3	8.8	1.7	3.5	1.8	80.7	19.3

Western Washington.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Total	100.0	34.4	5.5	4.4	3.0	6.4	9.4	7.4	4.7	4.6	2.5	82.3	17.7
Douglas fir	100.0	36.9	3.3	5.3	2.2	6.6	9.7	6.9	4.7	4.5	2.5	82.6	17.4
Western pine	100.0	50.0	.....	.....	.....	.....	50.0	.....	.....	.....	.....	100.0	.....
Cedar	100.0	26.1	4.7	3.8	3.3	6.9	10.4	10.2	6.6	5.8	3.3	81.1	18.9
Hemlock	100.0	30.5	15.5	1.5	6.1	5.8	6.7	7.0	3.4	3.7	1.8	82.0	18.0
Spruce	100.0	24.4	10.5	1.2	7.0	7.0	10.5	9.3	5.8	4.6	2.3	82.6	17.4
All other species	100.0	43.7	14.1	.....	1.6	1.6	6.2	6.2	1.6	4.7	1.6	81.3	18.7

Table 40 shows that on the Pacific slope the first 10 groups have, roughly, 80 per cent of every species, except redwood, of which they have 93.2 per cent.

Table 41, below, shows what percentage each species constitutes of the total holdings in each group on the Pacific slope. It will be seen that with the exception of redwood and perhaps western pine there is, broadly speaking, a general similarity in the distribution of species among the various groups. This is especially marked if comparison be made between the first 10 groups collectively and group 11. Thus 56.8 per cent of the total timber in these 10 groups is Douglas fir, as compared with 61.9 per cent for group 11. The percentages for hemlock and unenumerated species are identical in the two cases.

This general similarity is due to the fact already noted that the various species generally are intermingled by nature throughout this area. In the case of redwood, however, the stand is compact and fairly homogeneous. This valuable species, it will be seen, represents 13.5 per cent of all the timber in the first 10 groups and only 4.3 per cent of that in group 11.

TABLE 41.—HOLDINGS OF STANDING TIMBER ON THE PACIFIC SLOPE: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES.

[Percentages computed from Table 39. See note at head of Table 39.]

PACIFIC SLOPE.

Total.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	57.8	57.0		53.4	54.2	57.0	56.7	54.8	61.5	63.9	59.9	56.8	61.9
White pine	(1)	.....	.....	.....	.....	.....	.....	.....	.....	.....	.6	(1)	.1
Western pine	9.1	13.7		4.6	5.9	2.3	5.0	7.0	4.4	2.2	7.6	8.7	10.9
Sugar pine	3.8	4.9		1.5	2.3	1.8	3.8	4.6	3.2	1.1	3.5	3.7	4.4
Redwood	11.8	6.7		30.5	24.9	24.5	16.4	9.0	9.5	10.7	8.7	13.5	4.3
Cedar	6.0	5.5		4.3	3.6	5.4	5.7	8.3	9.1	10.7	8.7	5.9	6.4
Hemlock	6.5	7.5		3.1	6.1	4.4	6.4	7.3	6.9	7.0	6.4	6.5	6.5
Spruce	2.3	1.7		.5	2.5	2.5	2.5	4.2	3.8	2.2	2.9	2.2	2.8
All other species	2.7	3.0		2.1	.5	2.1	3.5	4.8	1.6	2.2	1.7	2.7	2.7

California.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	100.0		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	18.2	21.9		10.4	21.3	16.0	8.0	8.8	14.3	12.5	8.6	16.6	26.8
Western pine	24.6	36.5		10.9	13.7	6.6	15.6	24.8	12.5	10.0	31.4	22.8	34.5
Sugar pine	9.6	11.0		3.6	5.4	4.1	12.4	15.3	10.7	2.5	11.4	9.0	12.9
Redwood	41.1	24.5		71.5	57.9	68.4	54.8	35.8	53.6	72.5	42.9	45.4	17.8
Cedar	1.4	.9		1.2	1.7	1.6	.8	2.2	1.8	.....	.....	1.2	2.3
Spruce	.5	.1		.8	.....	.4	1.2	.7	1.8	.....	2.8	.5	.5
All other species	4.6	5.1		1.6	.....	2.9	7.2	12.4	5.3	2.5	2.9	4.5	5.2

Western Oregon.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	77.4	65.0	85.6	86.6	88.2	86.0	82.3	76.3	75.2	78.5	77.1	77.6	76.6
White pine	.1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.4	(1)	.1
Western pine	5.0	13.4	1.5	.....	.....	.....	.6	1.9	5.3	1.9	2.9	4.9	5.6
Sugar pine	2.7	6.6	.6	.....	.....	.7	.3	2.0	3.0	1.9	2.9	2.6	2.8
Cedar	3.5	5.0	2.3	3.7	1.7	3.0	2.4	2.4	3.0	7.5	4.3	3.6	3.3
Hemlock	6.8	7.6	5.6	6.0	5.9	4.2	9.6	8.2	8.3	6.5	7.1	7.0	6.2
Spruce	2.9	1.6	2.3	.....	3.4	3.8	2.7	6.8	4.5	1.8	2.9	2.6	3.9
All other species	1.6	.8	2.1	3.7	.8	2.3	2.1	2.4	.7	1.9	1.4	1.7	1.5

[1] Less than one-tenth of 1 per cent.

TABLE 41.—HOLDINGS OF STANDING TIMBER ON THE PACIFIC SLOPE: DISTRIBUTION OF THE TIMBER IN EACH SIZE GROUP, BY SPECIES, IN PERCENTAGES—Contd.

PACIFIC SLOPE—Continued.

Western Washington.

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Douglas fir	68.8	73.7	41.9	83.1	51.9	70.7	71.0	64.0	68.0	67.8	68.7	69.0	67.7
Western pine	.1	.1	.....	.....	.....	.....	.4	.....	.....	.....	.....	.1	.....
Cedar	13.4	10.2	11.5	11.9	14.8	14.4	14.9	18.5	18.7	16.9	17.9	13.3	14.4
Hemlock	12.1	10.7	34.4	4.2	24.7	10.9	8.6	11.5	8.6	9.7	8.9	12.1	12.3
Spruce	3.2	2.3	6.1	.8	7.4	3.4	3.5	4.0	3.9	3.2	3.0	3.2	3.1
All other species	2.4	3.0	6.1	.....	1.2	.6	1.6	2.0	.8	2.4	1.5	2.3	2.5

CHAPTER IV.

ACREAGE OF TIMBER HOLDINGS.

Section 1. Acreage of holdings, classified by size in investigation area.

This chapter presents data on the acreage of land involved in the timber holdings classified in the preceding chapter.

As will be noted from question 9 of the timber schedule (see p. 276), the information obtained regarding acreage relates primarily to the timber holdings. Special emphasis was laid upon the acreage of land now bearing merchantable saw timber. The owners were asked to make a separate statement of other land, but a great many did not report it at all. Again, vast areas of nontimbered land are owned by corporations controlled by the same interests that control timber corporations; but no reports were obtained from such land-owning corporations. Furthermore, in other cases the timber owners are known to own land outside the timbered parts of the States in the investigation area (for instance, the great Southern Pacific land holding in southern California); but in the few cases where such land was reported it is not included in the tables. For these three reasons, large amounts of land owned by the timber holders of the investigation area are not shown in the tables of this section.

Table 42 shows the acreage reported in the investigation area as bearing merchantable saw timber, classified according to the groups used in Table 20; that is to say, in this and similar tables in this chapter holdings of timberland are not grouped in the order of their acreage, but in accordance with the size of the holding of timber. In other words, the grouping of the acreage of a given holder is determined by the amount of his timber and not by his acreage. The acreages here given by groups correspond, therefore, to the groups of timber in the companion timber tables preceding. The order of land holdings as such would be considerably different. A discussion of concentration of land holdings will be taken up in Part II.

In many cases, especially in lumbering sections, it was impossible to separate timbered acreage from that of open, cut-over, and young timber land. The nontimbered and young timber land was distinguished from the timbered land wherever the information could be obtained (see Table 43), but in the records of many holders the separation is not made. In the lumbering sections there are, therefore, considerable acreages of cut-over and young timber land included in Table 42, and in some other cases considerable acreages of open land. This is especially the case in the Upper Peninsula of Michigan, where some enormous land holdings were reported without division between timbered and cut-over land, although the amount of timber owned was comparatively small.

TABLE 42.—ACREAGE OF TIMBER HOLDINGS AS GROUPED IN TABLE 20, FOR THE INVESTIGATION AREA.

[In thousands of acres. Thus, 154,130=154,130,000 acres. This table shows the acreage bearing the timber as classified in Tables 20 and 26—i. e., according to the size of timber holdings in the investigation area. The figures here given include both timber acreage owned in fee and timber rights. See page 162 for further qualification as to the use of these figures. The entries in italics show the number of holders in each group for the investigation area.]

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
		3	*5*	*14*	*26*	*42*	*105*	*190*	*273*	*489*	*655*	*1,802*	
Investigation area..	154,130	8,763	2,139	5,101	6,321	8,274	9,710	11,140	11,270	9,498	6,876	79,092	75,038
Pacific-Northwest........	31,620	8,725	2,060	2,911	1,531	1,096	1,814	1,422	925	829	552	21,865	9,755
California............	7,386	1,939	1,124	329	656	298	463	314	114	92	120	5,449	1,937
Oregon...............	10,066	2,288	516	648	445	394	821	507	320	284	198	6,421	3,645
Washington..........	8,591	3,018	288	223	242	303	439	492	307	395	195	5,902	2,689
Idaho................	2,571	327	130	688	42	87	91	103	105	58	14	1,645	926
Montana.............	3,006	1,153	2	1,023	146	14	.....	6	79	.....	25	2,448	558
Southern Pine Region....	104,725	.....	.....	2,190	2,941	6,730	6,452	7,666	8,510	6,919	5,207	46,615	58,110
Missouri (part).......	2,447	.....	.....	.....	.....	166	208	236	102	414	118	1,244	1,203
Arkansas............	13,905	.....	.....	.....	337	673	550	999	1,021	774	596	4,950	8,955
Texas................	9,336	.....	.....	1,207	315	632	117	598	569	385	327	4,150	5,186
Louisiana............	12,476	.....	.....	260	1,269	1,112	1,296	817	1,049	871	633	7,307	5,169
Mississippi...........	12,063	.....	.....	579	259	619	797	501	908	573	483	4,719	7,344
Alabama.............	10,879	.....	.....	1	92	122	480	1,165	618	675	484	3,637	7,242
Florida..............	17,659	.....	.....	134	79	2,346	2,219	2,394	2,448	2,026	1,384	13,030	4,629
Georgia (part)........	11,130	.....	.....	.....	.....	415	298	30	954	452	546	2,695	8,435
South Carolina (part).	4,847	.....	.....	9	.....	432	38	461	309	247	258	1,754	3,093
North Carolina (part)	7,466	.....	.....	.....	565	34	389	449	493	463	281	2,674	4,792
Virginia (part).......	2,517	.....	.....	.....	25	179	60	16	39	39	97	455	2,062
Lake States..............	17,785	38	79	.....	1,849	448	1,444	2,052	1,835	1,750	1,117	10,612	7,173
Michigan............	8,315	.....	20	.....	1,194	182	692	1,171	1,081	856	675	5,871	2,444
Wisconsin...........	4,686	.....	.....	.....	77	264	262	593	665	750	334	2,945	1,741
Minnesota...........	4,784	38	59	.....	578	2	490	288	89	144	108	1,796	2,988

Table 42 includes both the acreage owned in fee and the acreage on which only the timber rights—i. e., the right to remove the timber within a certain number of years—are owned. In the Pacific-Northwest the amount of timber rights is negligible, and the figures given may be taken as showing ownership in fee. Only comparatively small acreages are owned as timber rights in the Lake States. In the Southern Pine Region, however, large areas are owned as timber rights, a few of the principal holdings being largely of this character. Some of the reports obtained do not distinguish the land so controlled, and it is therefore impossible to make a complete and accurate separation. In a great many cases the fee to this land is owned by other large landowning corporations.

Table 42 shows the acreage bearing the timber as grouped in Tables 20 and 26. Thus, Table 20 shows that 12 holders, each having from 5 to 13 billion feet in the investigation area, own 97.4 billion feet in the Pacific-Northwest, distributed as follows: California, 24.9; Oregon, 33.3; Washington, 11.8; Idaho, 19.1; and Montana, 8.3 billion feet. Table 42 shows that this timber stands on 2,911,000 acres, distributed as follows: California, 329,000; Oregon, 648,000; Washington, 223,000; Idaho, 688,000; and Montana, 1,023,000 acres.

Table 43 shows additional land owned in fee by some of the holders whose timberland is given in Table 42. This additional land is excluded from Table 42 because definitely reported as cut-over or as bearing young timber or as nontimbered. In both tables the holdings are grouped by number of feet of merchantable saw timber; that is, in each of Tables 20, 26, 42, and 43 a holder appears in the same group (determined by the amount of timber he owns).

A large part of the additional land in Table 43 bears young timber not yet merchantable, and most of the rest is of the same character as the timber-bearing land in the same holdings. The table is therefore of value in a consideration of the future supply of timber. As already pointed out, this table is not a full statement of the additional land of this kind owned by timber holders in the timbered parts of the investigation area, and of course it excludes great tracts owned elsewhere. (See p. 162.)

TABLE 43.—ACREAGE OF LAND BEARING YOUNG TIMBER AND OF NONTIMBERED LAND OWNED IN CONNECTION WITH THE TIMBER HOLDINGS AS GROUPED IN TABLE 20.

[In thousands of acres. Thus, 10,652=10,652,000 acres. This table includes only the additional lands owned in fee. As explained on p. 162, it does not include all additional land of this character thus owned.]

	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.
Investigation area	772	61	353	622	1,871	1,959	1,136	1,615	1,228	1,035	10,652
Pacific-Northwest	772	31	352	35	68	117	121	87	52	52	1,687
California	382	10	58	4	15	46	92	35	5	28	675
Oregon	184	8	77	13	12	37	12	20	12	8	383
Washington	137	13	61	16	41	34	17	31	34	14	398
Idaho	69	......	52	......	......	......	......	......	1	2	124
Montana	......	......	104	2	......	......	......	1	......	......	107
Southern Pine Region	......	......	1	158	1,638	1,251	654	1,269	719	751	6,441
Missouri (part)	......	......	......	......	......	1	10	......	8	24	43
Arkansas	......	......	......	14	53	27	89	128	41	81	433
Texas	......	......	......	29	85	......	74	69	30	21	308
Louisiana	......	......	......	67	211	102	90	36	147	73	726
Mississippi	......	......	......	......	15	12	24	28	43	37	159
Alabama	......	......	......	17	22	23	52	230	48	43	435
Florida	......	......	......	31	1,252	1,079	177	695	372	354	3,960
Georgia (part)	......	......	......	......	......	......	......	47	15	98	160
South Carolina (part)	......	......	1	......	......	7	61	31	15	17	132
North Carolina (part)	......	......	......	......	......	......	77	5	......	......	82
Virginia (part)	......	......	......	......	......	......	......	......	......	3	3
Lake States	......	30	......	429	165	591	361	259	457	232	2,524
Michigan	......	30	......	390	66	131	204	169	201	65	1,256
Wisconsin	......	......	......	......	99	189	105	30	144	165	732
Minnesota	......	......	......	39	......	271	52	60	112	2	536

The three greatest timber owners—the Southern Pacific, the Weyerhaeuser Timber Company, and the Northern Pacific (group 1)—own 8,725,000 acres of timberland and 772,000 acres of additional land in the timbered parts of the Pacific-Northwest. This acreage of these three holders is shown below by States. (See p. 167 for the total land holdings of the Southern Pacific and Northern Pacific.)

TABLE 44.—NUMBER OF ACRES OF LAND OWNED BY THE SOUTHERN PACIFIC, WEYERHAEUSER TIMBER, AND NORTHERN PACIFIC COMPANIES, IN THE TIMBERED PARTS OF THE PACIFIC-NORTHWEST.

[In thousands of acres. Thus, 9,497=9,497,000 acres.]

	Total.	Southern Pacific.	Weyerhaeuser Timber.	Northern Pacific.
Pacific-Northwest	9,497	4,393	1,945	3,159
California	2,321	2,314	7	
Oregon	2,472	2,079	393	
Washington	3,155		1,542	1,613
Idaho	396		3	393
Montana	1,153			1,153

Maps of southwestern Washington, western Oregon, and northeastern California, to be presented in another Part, will show how completely these three great companies dominate the land in great areas of the country from Seattle to Sacramento. The importance of these holdings results only in part from the enormous value of their timber. Portions of them are very fertile, and will be valuable as agricultural land when the timber is cut and the stumps removed. Some of this land is similar to the present farming and orchard regions west of the Cascades. The ownership of this land, together with that of the railroad facilities, gives the interests in question a powerful influence on economic conditions in that part of the country.

The Amalgamated Copper Company owns over 1 million acres of timberland and more than 100,000 acres of nontimbered land, all in Montana, and Thomas B. Walker owns about 760,000 acres in California. Excluding Mr. Walker's holding in California, the four other holders in group 2 own 1,310,000 acres of timbered land in the Pacific-Northwest. Excluding the Amalgamated Copper Company, the 11 other holders in group 3 own 1,885,000 acres of timbered land in the Pacific-Northwest. The 20 holders in groups 1, 2, and 3 own 13,696,000 acres of timbered land in the Pacific-Northwest, and in addition to this they own 1,155,000 acres of nontimbered land.

The timberland owned or controlled by the 1,802 timber owners of groups 1 to 10, each of whom has at least 60 million feet of timber, together with the additional land which they own in the timbered parts of the investigation area, amounts to 89,744,000 acres.

Certain counties in the States of the Pacific-Northwest were not covered by the detailed inquiries of the Bureau, because they were known to have no merchantable timber. No land in such counties is included in Tables 42 and 43; and the amount of land held there by timber owners, particularly by the Southern Pacific in southern California and by the Northern Pacific in eastern Montana and eastern Washington, is very large. The tables include no Southern Pacific land in California south of Eldorado County; that is, south of about the latitude of Sacramento. In Montana they include only so much Northern Pacific land as lies in the extreme west of the State, and they omit the Northern Pacific land in several nontimbered counties of eastern Washington. The Northern Pacific still has nearly 10 million acres in all, and the Southern Pacific nearly 14 million, or, with the Union Pacific (which controls the Southern Pacific), nearly 15 million. (See Table 44 for the acreage of these two holders included in the tables of this chapter.)

After the enormous sales to such companies as the Weyerhaeuser Timber Company and the Amalgamated Copper Company, and after sales of other vast quantities to smaller purchasers, the land still held by the Northern Pacific, together with that of the Southern Pacific and the 9,700,000 acres of the Atchison, Topeka & Santa Fe, makes the present timbered and nontimbered holdings of these three railroads over 33,500,000 acres, an area as large as England.

ACREAGE OF TIMBER HOLDINGS, BY STATES.—Florida is by no means the largest State in the investigation area, being surpassed by Georgia, Minnesota, and Michigan, as well as by Texas and all the States of the Pacific-Northwest; but the timbered acreage in Florida is the largest—17,659,000 acres. Then follow Arkansas, with 13,905,000; Louisiana, 12,476,000; Mississippi, 12,063,000; Georgia (part), 11,130,000; Alabama, 10,879,000; and Oregon, 10,066,000. If the whole of Georgia had been covered by the Bureau's investigations, it would probably have shown between 12,000,000 and 13,000,000 acres; the total area, timbered and nontimbered, of the counties not covered, is 5,602 square miles, or 3,585,280 acres.

In respect to the acreage of timber controlled by the larger timber owners the order of the States is different; most of the southern States standing relatively lower and those of the Pacific-Northwest higher. Florida is again first, however, with 13,030,000 acres of timber in the hands of owners above 60,000,000 feet. Louisiana is second, with 7,307,000 acres, and no other State shows half so much as Florida. Next in order are Oregon, Washington, Michigan, and California, though none of these is among the first six States in total timbered area.

The preponderance of Florida lies in groups 5 to 10, ranging from 3½ billion feet down to 60 million per holder. No other State contains even half so much timberland in any one of these groups, except Louisiana in group 6, and here the proportion is little more than half. In Florida there are no holdings in groups 1 and 2, and in groups 3 and 4 the acreage is comparatively small.

Section 2. Approximate average stand per acre.

Table 45 shows the approximate average stand per acre of the timber owned in each group, as computed from Tables 20 and 42.

TABLE 45.—APPROXIMATE AVERAGE STAND PER ACRE OF TIMBER HOLDINGS AS GROUPED IN TABLE 20, FOR THE INVESTIGATION AREA.

[In thousands of board feet per acre. Thus, 11.3=11,300 feet per acre. This table is to be read in connection with Table 20, the entries here given being obtained by dividing a given entry in Table 20 by a corresponding entry in Table 42. Owing to the fact that in the acreage there is some land bearing young timber and some nontimbered land, these averages must be read broadly. See p. 162 for further qualification as to the use of these figures.]

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1–10.	Group 11.
Investigation area........	11.3	27.2	47.7	23.4	18.2	14.0	15.4	11.9	8.6	8.9	8.1	15.3	7.2
Pacific-Northwest..	32.0	27.2	49.2	33.5	46.4	58.9	50.7	41.6	37.1	38.4	33.2	36.9	21.1
California......	33.6	18.2	43.6	75.7	41.9	71.1	57.0	39.5	45.6	45.7	27.5	38.4	20.0
Oregon.........	39.5	39.0	67.1	51.4	60.0	61.9	48.6	46.0	42.8	44.7	38.4	47.6	25.4
Washington....	34.3	33.8	51.4	52.9	58.3	55.4	52.2	44.3	40.1	34.9	34.9	40.2	21.3
Idaho..........	19.6	13.8	23.1	27.8	23.8	23.0	29.7	15.5	21.9	19.0	21.4	22.9	13.8
Montana.......	7.3	5.6	......	8.1	11.6	14.3	......	16.7	10.1	......	12.0	7.3	7.0
Southern Pine Region.............	6.1	......	......	10.1	11.1	7.1	7.8	7.7	6.0	6.1	6.0	7.2	5.1
Missouri (part).	4.0	......	......	......	......	1.8	5.8	7.2	3.9	2.2	5.9	4.2	3.9
Arkansas.......	5.7	......	......	......	8.6	5.2	11.1	8.3	7.6	6.7	6.9	7.7	4.6
Texas..........	7.1	......	......	9.3	11.4	9.5	5.1	8.2	7.4	8.6	8.3	8.8	5.7
Louisiana......	9.6	......	......	14.2	12.0	13.3	12.2	14.0	9.0	8.6	7.9	11.3	7.2
Mississippi.....	7.9	......	......	11.2	16.6	12.8	9.7	9.2	7.9	9.6	8.5	10.1	6.5
Alabama.......	5.2	......	......	......	10.9	7.4	5.4	6.4	5.8	5.6	5.0	6.0	4.8
Florida.........	4.2	......	......	4.5	8.9	3.2	5.4	5.7	4.1	4.1	4.0	4.5	3.4
Georgia (part).	4.1	......	......	......	......	5.3	3.7	6.7	3.4	4.2	4.2	4.0	4.2
South Carolina (part)	6.3	......	......	11.1	......	7.6	10.5	6.7	6.5	8.9	8.1	7.5	5.7
North Carolina (part)........	5.7	......	......	......	8.7	8.8	6.2	6.5	6.5	6.5	6.0	6.9	5.1
Virginia (part).	5.8	......	......	......	4.0	7.3	6.7	[1]37.5	7.7	7.7	7.2	8.1	5.2
Lake States........	5.6	......	7.6	......	6.3	8.3	4.9	7.1	5.9	6.3	5.2	6.1	4.9
Michigan.......	5.7	......	10.0	......	5.0	8.8	4.9	5.5	4.6	6.8	4.1	5.3	6.7
Wisconsin......	6.2	......	......	......	7.8	8.0	7.6	9.9	7.2	5.9	6.6	7.5	4.1
Minnesota......	4.8	......	6.8	......	8.7	......	3.5	7.6	11.2	5.6	7.4	6.6	3.8

[1] See note on p. 170.

The average stands in the above table must be read very broadly, and must not be regarded as in any way precise. As stated on page 163, the acreages in Table 42 include some cut-over and some nontimbered land, which could not be excluded on the basis of the information reported to the Bureau. The averages here given, therefore, are not exact averages for the timbered acreage. The effect of the error is, of course, to understate the average. Again, on the Pacific coast there is a very wide range from tract to tract, varying from enormous stands per acre to the light stands along forest borders.

For this reason, therefore, the averages here given, aside from being only approximate, do not represent the average stands in the forest areas containing the bulk of the timber supply. It may be noted in particular that the great stands of Douglas fir in Washington and Oregon and of redwood in California are averaged with comparatively low stands east of the Cascades and of the Coast Range. Averages for selected forest areas would be very much greater than the averages here given. Thus, in the Douglas fir region of the Pacific-Northwest average stands of over 75,000 feet per acre over large areas are frequent, and in California stands of redwood of over 100,000 feet per acre are usual.

The average for all timbered land in the investigation area is 11,300 feet per acre. In the Pacific-Northwest the average is 32,000 feet per acre; Southern Pine Region, 6,100; and Lake States, 5,600. No State in the Lake States or the South averages so much as 10,000. Louisiana ranks considerably above any other State in these regions, with 9,600 feet per acre. This average is largely due to heavy stands of cypress and longleaf pine. Mississippi and Texas, which also have large areas of fine virgin longleaf pine, come next, with averages of 7,900 and 7,100. The only others so high as 6,000 are South Carolina, with 6,300, and Wisconsin, with 6,200. Missouri stands lowest, with 4,000. The next lowest is Georgia, whose great forests of longleaf, depleted by many years of lumbering, have been only scantily replaced and whose average stand appears as 4,100 feet per acre.

The only State of the Pacific-Northwest whose average stand is not very much above these is Montana; and even Montana shows 7,300 feet per acre, which surpasses all the Lake States and all States of the Southern Pine Region except Louisiana and Mississippi. In Idaho the average is 19,600; California, 33,600; Washington, 34,300; and Oregon, 39,500.

It is the large holdings that have the high stands. In the Lake States the average stand reported for holdings of 60 million feet and over is about one-fourth greater than for holdings below that size; Southern Pine Region, two-fifths greater; and Pacific-Northwest, three-fourths greater. In California, Oregon, and Washington the average for such large holdings is nearly twice as great as for those under 60 million feet.

Even among the holdings above 60 million feet the smallest holdings have the least timber per acre. The average in the Lake States is 5,200 feet for group 10, embracing holdings of from 60 million to 125 million feet, while for all the higher groups together it is 6,200, this last average being an understatement, owing to the inclusion of cut-over land. (See p. 163.) In the Southern Pine Region the average for groups 8, 9, and 10, ranging from 500 million down to 60 million feet per holder, is 6,000, while it is 8,100 for the higher groups together, and in the holdings of more than 3½ billion feet each it rises above 10,000. In the Pacific-Northwest the average for group 10 is 33,200 feet; for all the higher groups together, excluding the two great railroad holdings, it is 47,000.

Table 45 shows only one conspicuous exception to the rule that the high stands per acre are in possession of the big holders.[1] This exception is group 1 in the Pacific-Northwest, where the average is below those of all the lower groups in the same region down to the 60-million line. This is due to the two great railroad holdings. The other large holdings have been selected for timber and include in great part the best timber in their respective territories. The railroad land, acquired by Federal grant, consisted chiefly of alternate sections, and thus ran about like the average of the localities traversed. In the case of the Northern Pacific, the present holding is a residuum from which the best timber has been selected by the Weyerhaeuser Timber Company and others. The average stand of the Weyerhaeuser Timber Company is nearly 50,000 feet per acre; that of the remaining Northern Pacific timberland is 11,500.

Section 3. Acreage of holdings, classified by size in each State.

Tables 46 and 47 present data on land holdings of timber owners according to the size of the timber holding in each State. In other words, they occupy the same relation toward Table 33 that Tables 42 and 43 do toward Table 20. The number of holdings in Table 46 is shown in Table 48.

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[1] One other exception appears in group 7 in Virginia. It happens that no Virginia timber falls in this group except certain tracts of second-growth pine which have attained an extraordinary density. The average shown in this instance must not be taken as in any way representing normal conditions.

TABLE 46.—ACREAGE OF TIMBER HOLDINGS AS GROUPED IN TABLE 33, FOR EACH STATE SEPARATELY.

[In thousands of acres. Thus, 7,386=7,386,000 acres. This table shows the acreage bearing the timber as classified in Table 33, i. e., according to the size of the timber holdings in the particular State. The figures here given include both timber acreage owned in fee and timber rights. See p. 162 for further qualification as to the use of these figures.]

	Total.	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.	Group 11.
Pacific-Northwest:													
California	7,386	1,939	762	507	784	300	374	407	134	103	139	5,449	1,937
Oregon	10,066	2,288	248	741	356	401	746	757	346	308	230	6,421	3,645
Washington	8,591	3,018	......	414	69	403	439	470	414	431	244	5,902	2,689
Idaho	2,571	327	......	676	......	128	114	164	127	75	34	1,645	926
Montana	3,006	1,153	......	1,023	......	......	113	......	113	14	32	2,448	558
Southern Pine Region:													
Missouri (part)	2,447	......	......	......	......	......	......	321	381	413	129	1,244	1,203
Arkansas	13,905	......	......	......	......	571	791	976	1,012	843	757	4,950	8,955
Texas	9,336	......	......	1,090	......	414	470	768	562	470	376	4,150	5,186
Louisiana	12,476	......	......	......	726	1,769	1,209	798	1,048	934	823	7,307	5,169
Mississippi	12,063	......	......	......	624	719	583	536	966	655	636	4,719	7,344
Alabama	10,879	......	......	......	......	......	96	1,207	1,021	706	607	3,637	7,242
Florida	17,659	......	......	......	......	1,911	2,612	2,352	2,476	2,118	1,561	13,030	4,629
Georgia (part)	11,130	......	......	......	......	384	297	......	837	440	737	2,695	8,435
South Carolina (part)	4,847	......	......	......	......	391	......	346	379	271	367	1,754	3,093
North Carolina (part)	7,466	......	......	......	565	......	170	584	448	580	327	2,674	4,792
Virginia (part)	2,517	......	......	......	......	......	179	16	98	29	133	455	2,062
Lake States:													
Michigan	8,315	......	......	......	1,134	......	60	1,350	1,446	973	908	5,871	2,444
Wisconsin	4,686	......	......	......	......	......	90	641	868	882	464	2,945	1,741
Minnesota	4,784	38	......	......	387	......	191	697	108	180	195	1,796	2,988

TABLE 47.—ACREAGE OF LAND BEARING YOUNG TIMBER AND OF NONTIMBERED LAND OWNED IN CONNECTION WITH THE TIMBER HOLDINGS AS GROUPED IN TABLE 33.

[In thousands of acres. Thus, 382 =382,000 acres. This table includes only the additional land owned in fee. As explained on p. 162, it does not include all additional land of this character thus owned.]

	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.
Pacific-Northwest:											
California	382	......	68	4	15	30	103	35	6	32	675
Oregon	184	1	72	13	6	43	20	11	22	11	383
Washington	137	......	40	15	66	29	19	42	35	15	398
Idaho	69	......	50	......	......	......	......	......	1	4	124
Montana	......	......	104	......	......	......	......	2	......	1	107
Southern Pine Region:											
Missouri (part)	......	......	......	......	......	......	12	......	8	23	43
Arkansas	......	......	......	......	......	26	81	161	58	107	433
Texas	......	......	......	......	40	45	74	98	30	21	308
Louisiana	......	......	......	25	208	102	134	34	132	91	726
Mississippi	......	......	......	......	16	5	28	24	42	44	159
Alabama	......	......	......	......	......	24	33	99	201	78	435
Florida	......	......	......	......	1,183	1,147	132	772	371	355	3,960
Georgia (part)	......	......	......	......	......	......	......	11	15	134	160
South Carolina (part)	......	......	......	......	......	......	60	26	20	26	132
North Carolina (part)	......	......	......	......	......	......	74	3	5	......	82
Virginia (part)	......	......	......	......	......	......	......	......	......	3	3
Lake States:											
Michigan	......	......	......	381	......	9	203	277	272	114	1,256
Wisconsin	......	......	......	......	......	......	103	152	259	218	732
Minnesota	......	......	......	......	......	39	270	112	......	115	536

TABLE 48.—NUMBER OF HOLDINGS IN EACH GROUP SHOWN IN TABLE 46.

	Group 1.	Group 2.	Group 3.	Group 4.	Group 5.	Group 6.	Group 7.	Group 8.	Group 9.	Group 10.	Groups 1-10.
Pacific-Northwest:											
California	1	1	5	7	9	16	23	20	28	40	150
Oregon	2	1	4	6	9	29	43	40	69	111	314
Washington	2	....	2	1	8	19	34	46	84	99	295
Idaho	1	....	2	....	1	2	4	9	8	9	36
Montana	1	....	1	....	....	1	....	3	1	5	12
Southern Pine Region:											
Missouri (part)	....	....	....	....	....	....	3	4	5	9	21
Arkansas	....	....	....	....	1	6	13	21	35	58	134
Texas	....	....	1	....	2	3	9	12	21	33	81
Louisiana	....	....	....	2	8	10	17	28	50	74	189
Mississippi	....	....	....	2	4	4	7	24	36	59	136
Alabama	....	....	....	....	....	1	12	16	23	37	89
Florida	....	....	....	....	2	9	19	33	52	67	182
Georgia (part)	....	....	....	....	1	1	....	9	12	31	54
South Carolina (part)	....	....	....	....	1	....	4	8	14	32	59
North Carolina (part)	....	....	....	1	....	1	6	9	21	25	63
Virginia (part)	....	....	....	....	....	1	1	2	2	9	15
Lake States:											
Michigan	....	....	....	1	....	1	10	21	36	41	110
Wisconsin	....	....	....	....	....	1	9	18	34	34	96
Minnesota	....	....	....	1	....	1	4	4	8	14	32

Tables 46 and 47 above have the same general meaning as Tables 42 and 43. They are presented chiefly for use in connection with Table 33 by those interested in a particular State. Thus, Table 33 shows that the 16 holders in group 6 own 22.5 billion feet of timber in California. Table 46 shows that this timber stands on 374,000 acres, and Table 47 shows that some of these 16 holders own 30,000 acres of additional land in the timbered parts of the State.

The land-grant railroads and the Weyerhaeuser Timber Company are, of course, the greatest landowners in the investigation area; but if these be disregarded Florida appears again in Tables 46 and 47 as preeminently the State of great land holdings. The two largest timber owners hold the timber on 1,911,000 acres, and they own 1,183,000 acres of cut-over or of nontimbered land besides.

CHAPTER V.

VALUE OF STANDING TIMBER.

Section 1. Purpose and limitations of this discussion.

The existing widespread speculative holding of timber lands has been referred to. The fact has been pointed out that such holders add little or no improvement to such timber and that their public services rendered therein are practically negligible in comparison with the great profits received from the rise in timber prices.

It is desirable, therefore, to indicate concretely and in some detail this rise in price that has taken place during the period of concentration, and thus to give some suggestion of the profits which have thereby accrued to the private holders of timber.

The value of timber varies so extremely, according to location, species, quality, and stand, that it is impossible to measure accurately the average amount of the advance. For the purpose of this report it is not necessary so to measure it. The comparative figures hereafter given are not intended to represent the absolute values of any kind of timber or to establish in any sense a timber price. The danger of using any of the following figures to establish an absolute price can be best illustrated by a single example. In Washington a lumber company paid about $3.25 per thousand in 1906 for a certain piece of timber. But this same company refused in the spring of 1909 to pay more than 22 cents a thousand for another piece in the same township, of similar timber but less favorably situated for logging. This shows the danger of using these figures for any other purpose than that for which they are here given. That purpose is simply to demonstrate a movement of price, rather than the absolute price of any class of timber, and for that purpose they are conclusive.

The present chapter discusses the causes which determine the value of standing timber, the rate at which timber values have risen, the probable future increase, and the degree in which private owners have profited by the advance.

As population increases, demand increases for a natural resource like timber, and at the same time the supply of such a limited resource diminishes. This increase of demand, with decrease of supply, results wholly to the advantage of those who have secured control of the natural resource. The power of the great timber owners increases, not only as the timber passes more and more into their hands, but also as its value rises.

No attempt has been made by the Bureau to estimate closely the total value of the standing timber in the investigation area, or the value of any holding or group of holdings. Such an estimate, if it could be accurately made, would indicate the present pecuniary importance of this natural resource, and of such parts of it as have been placed in particular hands. Its present pecuniary importance is a poor measure, however, of its actual significance to the commonwealth. By the pecuniary measure, the forests of Washington and Oregon had little importance 25 years ago, and even now the part they are to play can be judged better from their contents than from their price. Their price is low as yet, partly because the freight rates to the great markets are so high; but they will sooner or later play an overwhelmingly important rôle in the lumber markets, and their importance will in all reasonable probability be attested by an enormously increased price.

This is the evident opinion of men who are accumulating great estates in timber. Such estates are acquired or held only for the profit of holding them, and it is certain that their owners expect the future advance to cover the interest on their present value, as well as taxes and other carrying charges.

Section 2. Causes which determine the value of standing timber.

The value of standing timber depends ultimately upon—

1. The market value of the lumber which can be manufactured from it.

2. The cost of logging, manufacturing, and getting to market.

This does not mean that the value of standing timber can be estimated by subtracting these costs from the market value of lumber. Interest and other factors keep the price of stumpage normally below the margin obtained by such a reckoning. But this margin is the basis of all stumpage value. Speaking broadly, stumpage value does not arise till lumber can be sold for more than the cost of converting trees into lumber; and the margin between that cost and the price of lumber determines a limit beyond which stumpage value can not permanently go.

It is true that during a temporary depression in the lumber market the current value of standing timber may possibly be greater than the current margin between lumber values and costs of production; that is, timber owners in general may hold their timber at a higher price than can at the moment be realized by manufacturing it. For a short time the market may possibly be supplied by timber-owning mills which are forced to sell in order to pay debts, or which prefer to keep running to maintain their organization and their place in the market, even though they get less thereby for their standing timber than they consider it worth, and less than they could probably realize by postponing cutting.

Omitting the purely personal matter of bargaining, the factors which determine the relative value of any lot of standing timber may be classified as follows: Species; quality: logging conditions; accessibility to mills; accessibility to market; size of holding; size, ownership, and topographic relation of neighboring holdings.

Species and quality are the most obvious factors in making one lot of timber worth more than another. Other things being equal, a white-pine tree may be worth ten times as much as a tupelo tree which would make the same amount of lumber. Tupelo lumber is worth little more than the cost of logging and manufacturing, while white-pine lumber, if the timber is of fair quality, is worth much more. But a particular white-pine tree may, of course, be so poor that it is not worth cutting.

Species and quality affect chiefly the value of the product, but they have an effect also on costs. The softer woods are easier to manufacture than the harder, and large and perfect timber is manufactured at less cost per unit of product than small and defective timber.

Other factors which affect the value of standing timber only on the side of cost, are logging conditions, accessibility to mill and market, size of holding, and relation to neighboring holdings.

Logging conditions include the density of the stand, the character of the ground, and the natural facilities for transportation. Other things being equal, a tract which bears 10,000 feet to the acre can be logged for less per thousand than one which bears 2,500. The timber in a cypress swamp, where no road can be built unless on piles, is worth less than if it stood on solid ground. Timber which must be hauled out over mountain roads is worth less, as it stands, than it would be if it stood upon a plain. Timber which can be rolled into a stream and floated to a mill is worth more than it would be if it had to be hauled the same distance by wagon or by rail.

Accessibility to mills and accessibility to markets depend partly on conditions of transportation and partly on growth and location of the markets themselves in accordance with the growth of population and industrial progress.

It is not obvious, till one has considered the special conditions of the industry, how the size of a holding can greatly affect its value per unit, nor how its value can be greatly affected by the ownership of neighboring timber.

It is physically possible to manufacture lumber wherever a portable sawmill can be erected. It is economically possible, in many places, to set up a portable mill and cut an isolated tract of a few acres.

But such manufacture is relatively expensive. A larger mill, with better equipment, would saw the same logs more cheaply, and with less waste and consequently with a greater product; its cost per unit of product would be lower. But a large mill will be built only when the owners are sure of timber enough to keep it occupied for some years. In a few places, as on Puget Sound, there is a large trade in logs, and a mill can rely for its supply upon the open market. In most parts of the country, however, there is no considerable offering of logs, and a mill can not depend on a supply except by securing the timber on the stump.

If a man has a timber holding of such size and such situation that the erection of a large mill to cut it is economically justified, and if he is not under financial pressure, his position is one of independence. He can build a mill himself, or he can deal on equal terms with buyers. The result is that, if he chooses to sell, he can get a price pretty definitely related to the anticipated margin between price of lumber and cost of converting trees into lumber.

The small owner is not, in the same sense, independent. His holding does not justify the building of a mill. If he gets anything for his timber, he must sell it. It is likely that not more than one large mill will be in a position to cut and haul his timber economically. If this is so, he either has no choice of purchasers, or his choice depends on mills of the smaller sort, whose own margin over the actual costs of production and marketing is less than that of larger mills.

To give the most favorable conditions for cutting, a holding must not only be large, but it must also be compact. The more compact it is the less often will the logging railroad have to pass through or around land from which it can derive no tonnage. The more compact the holding is, the greater the amount of timber which the owner can cut within a given radius, and the shorter the average haul. It is undesirable, therefore, on grounds of physical economy, for one large buyer to acquire timber interspersed with that of another owner. It is also undesirable for business reasons of another sort. The result is, as the investigation of the Bureau shows, that in a large proportion of cases each such buyer consults his own interest by keeping out of the territory of others. The small timber owner is often practically limited, therefore, to the choice between keeping his timber or selling it at such price as the one buyer in his neighborhood may think it wise to pay. This is so well recognized that large owners commonly reckon, not only the timber which they own, but also that which they "control;" that is, timber which is so interspersed with their holdings that no one else can well handle it.[1] Under these circumstances, the small holders naturally receive less than they would receive if there were active competition among several buyers, each of whom was in a position to make the most economical use of the timber. An agent of the Bureau, reporting in 1908 on the value of longleaf pine in southwestern Alabama, said:

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[1] For further discussion of control of timber, see pp. 96, 97.

> Large tracts in this and adjoining counties are bought at $3 per thousand feet; small tracts are picked up by forties at $1 to $1.50 per thousand feet.

A company in southern Arkansas, in 1907, named $2 a thousand as the prevailing price for pine stumpage; "that is, in buying small lots from individuals. Where a company has a block of timber that will make a good manufacturing proposition the price would range from $3 to $5 a thousand, depending on the cost of getting logs to the sawmill." A company in Texas estimated its own timber at 55,000,000 feet of pine and 10,000,000 feet of hardwood, but said that, with the addition of lands controlled by these holdings, it expected ultimately to have 100,000,000 feet of pine and 60,000,000 feet of hardwood. This company had paid about $2.50 a thousand for much of its stumpage, but for some small tracts it had paid as little as $1. A company in eastern North Carolina reported that it bought several million feet of pine stumpage in 1906 at an average cost of 90 cents a thousand. Prices in that region ranged generally from $1.50 to $3, and even $5, with an average probably not below $2.50. The company that bought at an average of 90 cents explained that the timber was in territory which would have to be logged over its railroad, and it was thus able to force down the price.

Even a considerable owner may be unable to get much more than the current price of small lots, unless his holding is large enough and compact enough to justify the erection of a mill. A lot of 15,000 acres of timber rights in southern Arkansas was sold in 1906 at $2.50 a thousand. This was probably a little more than small owners were generally getting in the region, but was considerably less than the value which large owners were putting on their own holdings. The seller explained:

> The price was much lower than the present value, but the tract was too small to be a commercial proposition, and the holding was scattered.

The present difficulty of logging small tracts and the present business need that a large mill own a supply of timber for 20 years or more do not arise from conditions inherent in logging as such, but from those inherent in the system of large holdings and of logging railroads that are not common carriers. It is these conditions which give large timber holders the power, on the one hand, to block in and control small holders, and on the other to cut off a sawmill from its natural supply of timber.

Had the laws under which the Government passed title to forest land made it impossible for anyone to own more than a comparatively small holding at a time there can be no doubt that logging railroads would have been built as branches of the commercial railroads, and would have transported logs as common carriers. This would have given the small holders facilities for transportation to a number of buyers; a sawmill likewise would not have been dependent on a few sellers. A sawmill, whether it bought timber in the log or on the stump, would have bought it currently, as a cotton mill buys cotton. The mill would have been an independent manufacturing enterprise, like a cotton mill, instead of being, as an important sawmill now is apt to be, an incident of timber holding. Each small tract of timber would normally have been almost equally accessible to several mills, and prices of timber might have been expected to be fixed by competition.

Such conditions existed formerly along the rivers of Maine, on the Susquehanna and the Delaware, and along the Mississippi. The rivers were the highways, open to small and great alike, and there were mills which owned no standing timber, but supplied themselves by current purchases of logs. Such conditions still exist to some extent on Puget Sound. But a small owner can not profit much by this situation unless he is within easy reach of the water or of a common carrier that will take his logs at a reasonable rate to the water.

CAUSES OF THE PROGRESSIVE RISE OF STUMPAGE VALUES.—The great determining causes of the general rise of stumpage values are two: The depletion of the forests and the increase of population. Improved facilities for transportation increase the value of the particular timber which they make more accessible to market, but they keep down the value of the timber which was already accessible, and whose advantage is thereby diminished.

A small fraction of the increased price of timber, but only a small fraction, may be attributed to the causes which have in recent years raised prices generally. Lumber agrees with other commodities in reflecting the depreciation of gold. So far as the increased price of lumber depends upon such general causes, however, only part of it is reflected in the price of stumpage; for part is taken up by the increased cost of production which the general rise of prices involves. Since the return from the standing timber when it is cut depends upon the difference between the value of the resultant lumber and the cost of cutting and marketing, any increase of these costs diminishes the return by so much. It is impossible to say definitely what the net effect of these general causes on stumpage prices may have been, but it has certainly been only a small part of the total increase.

Take, for instance, a quarter section in Oregon, which might have sold for $600 or $1,000 in 1895, and for $5,000, or $10,000, or $15,000, or $20,000, according to the stand and the local conditions, in 1910. Suppose that the peculiar circumstances which have raised the value of standing timber had not existed, and the price of stumpage had been affected only by the causes which have raised the prices of commodities generally. These general causes probably did not raise the price of 1895 by 50 per cent.[1] Fifty per cent would have given an increase of $300 or $500 on the Oregon quarter section. The actual increase has probably been 10 times as great, and may easily have been 20 or 40 times as great. Even where stumpage prices have only doubled or trebled in 15 years, the special have overwhelmingly outweighed the general causes.

In those parts of the country where large bodies of virgin timber still exist the whole value of stumpage may be said, in one sense, to have a speculative origin; that is, it depends upon the opinion which owners and buyers have of the probable value in the future. For instance, if owners and buyers generally believed that young trees were coming on in such numbers and would produce timber of such quality that good longleaf-pine stumpage could be bought 25 years hence for a dollar a thousand, no one would pay a dollar a thousand for it now for purposes of long time investment. It might, indeed, have no more than a nominal value, and in many places would be given, as it would have been given 50 years ago, to anyone who would remove it.

The small owner has usually little knowledge of conditions, of the history of timber values, or of their probable future movement. Moreover, as has been shown above (pp. 178, 179), the small owner is at a serious disadvantage in comparison with the large. So the timber whose rise of value is likely to be swiftest passes early into strong hands. The strong owner, who has bought to profit by the rise in value, is in no haste to sell. His practical withdrawal of large bodies of timber from the market creates an artificial scarcity, and accelerates the rise of prices. The rise again reacts upon the minds of the owners and encourages them to refuse to sell unless at prices higher yet. Though the number of important owners may be considerable, and though there may be no deliberate concert of action among them, their situation leads inevitably to a mode of dealing which has much of the effect of a monopolistic control.

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[1] By general causes are here meant such as affect the prices of all commodities in the same way. Notable among them in recent years has been the increase of the supply of gold. The changes of price due to general causes are approximately shown by average index numbers, based, as nearly as possible, on the prices of all commodities. The index number established by the Bureau of Labor was 93.6 for 1895 and 131.6 for 1910, an increase of 40.6 per cent. (Bulletin, Bureau of Labor, No. 93, p. 318.) With a liberal allowance for any failure of these index numbers to show the effect of general causes exactly, it may safely be said that such causes did not increase prices of timber between 1895 and 1910 by more than 50 per cent.

Section 3. Prices received for stumpage by the United States.

In the "public-land States," which include all continental United States, except the 13 original States and the "legislative" States of Maine, Vermont, West Virginia, Kentucky, Tennessee, and Texas, practically all the timber in the country was once owned by the people of the United States. Three-fourths of what now remains has passed out of their common ownership; much of it without payment, and most of the rest at $1.25 or $2.50 an acre. The era of land grants, beginning about 1850, passed millions of acres of valuable timber into the hands of railroad and other corporations, and the largest timber holdings now existing in the country are of this origin. Moreover, of the millions of acres of timberland granted by the Federal Government to the States (swamp grants, school grants, agricultural college grants, etc.), much was acquired by timber speculators in large tracts at low prices.

The land law passed in 1820 and not repealed until 1889 (repealed by 25 Stat., 854) provided for the disposal of public lands by private cash sale at $1.25 per acre. There was no limit to the amount one person might buy. The law simply required that before the land was disposed of at private sale it should be "offered" at public auction. Little of the land offered was sold at the public auctions. Most buyers waited and bought at private sale at the flat price of $1.25. Many large timber holdings were thus acquired directly from the Government. For the period from 1866 to 1876, as shown below, the private-sale law was suspended in five Southern States.

The private-sale law was supplemented by three other important laws under which individuals could secure public lands, though ostensibly in very limited amounts: (1) The preemption law, developed by various acts culminating in the act of 1841, which was in force till 1891, and under which settlers had a preference right to buy claims at $1.25 per acre ($2.50 per acre within primary limits of railroad grants); (2) the homestead law, in force from 1862, giving 160 acres free to any settler who should improve the land and reside on it five years; and (3) the timber and stone law, in force from 1878, giving anyone a right to enter one 160-acre claim at $2.50 per acre.

The preemption law was intended to encourage the establishment of homes on the public domain by preventing the dispossession of any settler who should establish a domicile and make improvements there, provided he would pay the minimum price of $1.25 an acre. The homestead act went still further by absolving such settlers from all indebtedness to the Government for their land. In timbered regions, however, these laws, as well as the timber and stone act, were largely used by lumber men to acquire timber land; and the claims, whether entered by dummies or entered by others without collusion, were commonly transferred to large timber holders soon after title was secured.

At the close of the Civil War there were still large amounts of public land in Alabama, Arkansas, Florida, Louisiana, and Mississippi, much of it covered with the finest virgin timber. In 1866 Congress directed that all public lands in these States should be reserved for settlement under the homestead act. As a matter of fact, many of the resulting homestead entries were fraudulent, being made by dummies at the instance of persons who desired to secure the timber, either for its value as timber or for turpentine. In 1876 Congress again made the public lands in these Southern States subject to sale at $1.25 an acre. More than 800,000 acres were sold in 1882 and more than 1,100,000 acres in 1883.

In the Pacific-Northwest the homestead law and the timber and stone law have been the principal means of acquiring timberland from the Government, aside from railroad land grants. By the terms of the timber and stone law the price of $2.50 an acre was a minimum, and it was within the discretion of the administrative officers to fix any higher price. In practice, however, the law was administered till recent years as if the price of $2.50 were unchangeable. Mr. H. H. Schwartz, former Chief of Field Service of the General Land Office, stated in 1909 that this law alone had resulted in the sale of over 12,000,000 acres of valuable timberlands, of which fully 10,000,000 acres had been transferred by the entrymen to corporate or individual timberland investors; and that these lands, which were sold by the Government for a gross sum of $30,000,000, were reasonably worth at the time of sale $240,000,000. (See p. 265.)

The evil effects of these railroad and State grants and of other land legislation are further discussed in Chapter VI.

Section 4. General increase in stumpage values.

To men settling as farmers in a new forest country, the timber was a burden. The settlers were anxious only to convert the timber land to fields, and they killed[1] and burnt the timber, or killed it and waited for it to rot. There are still corners of the United States where this condition is not wholly past. Within the last half dozen years, land has been leased for terms of years in the Yazoo-Mississippi delta, under contracts which required no payment from the lessees, but only that they should clear the land of timber. Since the year 1900 many thousand acres of virgin hardwood have been deadened and burnt in Alabama, Missisissippi, Louisiana, and Arkansas. The time was long past when timber of the better sorts was counted worthless in those regions. That which has been destroyed there in recent years has been chiefly gum and other species which the lumbermen had not learned how to treat and which consumers had hardly been compelled as yet to buy. As the more desirable species grow dearer, the less desirable are forced into use wherever they can be used, and so acquire a value as standing timber.

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[1] The trees are killed by the process called "girdling" or "deadening"—chopping a ring around the trunk deep enough to stop the flow of sap. The ground may be cultivated among the dead but standing trunks, while the branches gradually decay and fall, and at last the trunks themselves, one by one, fall or are pushed over or cut down. The fallen wood is gathered from time to time and burnt.

In the Northeastern States, every sort of sound timber had become valuable before the civil war; and during the last 50 years the timber of the Lake States and of most parts of the South has changed from an incumbrance or an object of indifference to a highly valued asset.

Mr. James D. Lacey, one of the best-known timber experts in the United States, sketched the general advance of stumpage values in the following terms at the annual meeting of the National Lumber Manufacturers' Association in April, 1910:

> In my own experience, hemlock stumpage in Pennsylvania 50 years ago was really a waste material, the bark being the real product. However, as the dense forests of Pennsylvania were penetrated and lumbering came to be carried on on a large scale, the value of stumpage advanced in keeping with the demand and the disappearance of the timber supply, until what is left there to-day is worth from $5 to $8 per thousand.
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> Government timberlands were to be had in Michigan as late as the year 1866 at $1.25 to $2.50 per acre. White-pine stumpage in Michigan passed the dollar mark in the early seventies and advanced to $5 a thousand and upwards in the year 1880. In the year 1880 pine stumpage in northern Minnesota ranged in price from 50 cents to $1 a thousand, and in the same year I bought shortleaf pine in what was then known as the "Irish Wilderness" in southern Missouri at 5 cents per thousand. Anywhere in the Southern Coast States pine stumpage could be had from the United States Government at $1.25 per acre (about 10 cents per thousand) and from the State governments at from 25 cents to 75 cents per acre. As you all know, Michigan, Wisconsin, and Minnesota stumpage advanced very rapidly after 1880 until reduced transportation and the change of base of the Michigan and Wisconsin lumbermen to the South aided in the development of that territory, and brought southern lumber into competition with northern white pine. The same condition existed on the Pacific coast until within the last six or seven years, with practically the same low range of prices.[1]

Mr. Lacey made the following statement in November, 1908, before the Committee on Ways and Means of the House of Representatives:

> In 1880, when I first went South, in Louisiana and Mississippi and those coast States, we estimated what the value of Government land was. It was nearly all vacant then, and it was timber land. In 1889 it was offered at $1.25 an acre. We located

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[1] The Forest and the Saw Mill (National Lumber Manufacturers' Association, official report eighth annual convention), pp. 200, 201.

> several million acres for northern lumber companies. We estimated those lands would cut about 6,000 feet per acre, as they were then cutting timber. They were not going above the first limbs; the balance was left in the woods or burned up.[1]

Mr. J. B. White, of Kansas City, one of the best-known lumber manufacturers in the United States, spoke as follows at a meeting of the Yellow Pine Manufacturers' Association, held at New Orleans, in January, 1909:

> As I have shown, stumpage increased in 20 years from 12½ cents to $4 per thousand in some places, and this explains. This money was made by the capitalists—by the speculator in these large investments. The Government had for many long years been offering these millions of acres of fine yellow-pine timber for $1.25 per acre, and finally capitalists began to buy. No settlement or cultivation or anything was required; only to pay this $1.25 per acre to the Land Department and get a United States patent of title.[2]

Mr. George K. Smith, secretary of the National Lumber Manufacturers' Association and also of the Yellow Pine Manufacturers' Association, made the following statement in April, 1907, regarding a tract of southwestern yellow pine:

> The increase in the value of standing timber is well illustrated by a tract of 85,000 acres bought within the last few months. * * * Eight or ten years ago there was an option on this tract at $4.75 per acre. This option was not exercised, and the price placed on the land rose to $12.50, $17.50, $22.50, $27.50, $35, and the tract was recently sold at $50 per acre. It will cut about 17,000 feet per acre.

Mr. George H. Emerson, vice-president of the North Western Lumber Company, of Hoquiam, Wash., in an article in "The Coast" magazine, speaking of the increase of timber values in western Washington, said:

> In 1882 * * * all lands west of the Northern Pacific grant were offered for sale [by the Government] at $1.25 per acre, without restriction as to the number of acres; to-day those lands are worth from $1.50 to $3 per thousand feet of their standing timber, often from $60 to $150 per acre, or from $15 to $30 per tree.[3]

Mr. W. I. Ewart, in an address before the Pacific Coast Lumber Manufacturers' Association, at Tacoma, August 25, 1905, said:

> Stumpage values have at intervals come to a standstill temporarily, but the tendency has been steadily upward and no advance has ever been lost. There has been no retrogression

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[1] Before the Committee on Ways and Means of the House of Representatives, Nov. 20, 1908: Tariff hearings, p. 1004.

[2] Paper on Forest Conservation in Yellow Pine, presented by J. B. White, at annual meeting of Yellow Pine Manufacturers' Association, Jan. 19-20, 1909.

[3] Oregon & Washington Lumber Manufacturers' Association et al. v. Union Pacific Railroad Co. et al. Before the Interstate Commerce Commission, No. 1327. Brief for railroads, p. 32.

except on the manufactured product. This has been uniformly and invariably true; depressions in the lumber market have at times lessened transactions in timber lands, but no decline from fixed valuations has ever been recorded. Mr. Frederick Weyerhaeuser once remarked to me that the only times he ever lost money on timberlands were the times when he didn't buy.

Section 5. Average values of stumpage.

The Bureau has made no effort to determine the average values of standing timber. Such an average could not be determined except by the expenditure of an enormous amount of time and money, and even then could be only approximate.

In Forest Service Bulletin 77, "Forest Products of the United States, 1906," page 40, the following table is presented, giving values for several species of standing timber for the years 1899, 1904, and 1907:

TABLE 49.—COMPARISON OF STUMPAGE VALUES, 1899, 1904, AND 1907.

[Figures for 1899 and 1904 are by the Bureau of the Census; those for 1907 are based on reports to the Forest Service.]

Kind.	Average value per M feet.			Kind.	Average value per M feet.		
	1899	1904	1907		1899	1904	1907
White pine	$3.66	$4.62	$8.09	Birch	....	....	$4.40
Ash	3.03	3.95	7.58	Cypress	$1.58	$3.42	4.37
Basswood	1.50	3.89	6.79	Cottonwood	1.45	2.61	3.97
Hickory	....	....	6.69	Beech	....	....	3.56
Oak	[1] 3.18	3.83	6.52	Yellow pine	1.12	1.68	3.16
Spruce	2.26	3.70	[2] 5.49	Maple	2.66	3.82	2.50
Chestnut	2.71	3.39	4.97	Red gum	1.68	1.67	2.46
Elm	3.30	5.58	4.94	Redwood	1.06	1.55	2.35
Poplar	2.81	3.89	4.64	Western pine	....	....	1.66
Cedar	1.32	1.49	4.63	Douglas fir	.77	1.05	1.44
Hemlock	2.56	3.51	[3] 4.51	Tupelo	....	....	1.27

[1] White oak only.
[2] Eastern spruce only.
[3] Eastern hemlock only.

The values given in this table do not profess to be true average values for all timber of the species named. Those for 1899 and 1904 are Census figures, based on the reported values, not of all timber, but of timber owned by sawmills. Those for 1907 are based on reports made to the Forest Service by about 1,500 manufacturers for timber in their vicinity. In each case most of the timber covered would be comparatively accessible, and its value would, in general, be above the average value of all timber of the given species.

This could not but happen in the newer regions, especially, and because of it the apparent rise would be less than the true rise of the average value of all timber. The timber frontier was much advanced between 1899 and 1907. A very large part of the supply was beyond the scope of milling operations or mill ownership in 1899, and did not enter into the mill reports of price, on which the Census averages were based. Much of this timber had only a trifling value. If account had been taken of it, the apparent average value for 1899 would have been greatly reduced; that is, the reported average for 1899 was far above the true average value of all timber. By 1907, the purview of lumbering activities had been greatly extended. The quantity, and still more the proportion, of timber which could then be regarded as remote had greatly shrunken. Moreover, even for that which was still remote, the difference between its value and the value of timber on the verge of cutting was much diminished. This resulted partly from the extension of logging railroads and the improvement of other logging facilities; partly from increased general confidence in the continued rise of timber values; partly from the concentration of ownership. The large owner, able to hold for the distant future, and to provide such transportation facilities as his property may need, allows a comparatively small difference, so far as his own timber is concerned, between the near and the remote. For these various reasons the real advance in timber values from 1899 to 1907 was much greater than a mere comparison of the mill returns would suggest.

The actual increase of value is further disguised, for many species, by the progressive exhaustion of the best supplies. The white pine, for instance, of 1907 was a different article from the white pine of 1899. It was, on an average, of poorer quality. The average value for white pine in the Forest Service table is $3.66 in 1899 and $8.09 in 1907; but the increase of value for identical material was greater.

The departures from any average or representative timber price are very great. In some places, under some circumstances, lots of any given species are selling at two or three or four times the average price; elsewhere, under other circumstances, other lots of the same species are selling for a few cents a thousand. Even in the same locality the variations are astonishingly wide. Within one small county of North Carolina, an agent of the Bureau, reported in 1907 that pine stumpage was bringing on an average from $2.50 to $3 per thousand, and also that it had sold within two years as high as $10 and as low as 50 cents.

The following comments, offered by the Forest Service in connection with the values for 1907 in the above table, show how far stumpage prices depart from uniformity.

> *White pine.*—The average stumpage value of $8.09 given for white pine is based upon 400 reports from 19 States. The average State values run from $1.56 in Alabama to $11.51 in Wisconsin. The quotations from New England and the Middle Atlantic States are considerably higher than those from farther

> south in the Appalachian region. The maximum value of white-pine stumpage, $20 per thousand, is reported from the farming counties of New York, northwest and central Pennsylvania, and northern Wisconsin. In Michigan, the quotations extend from $5 to $18, with an average of $10.73 for the lower peninsula and $11 for the upper. In Minnesota the range reported is from $5 to $12, with an average of $7.58.
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> *Yellow pine.*—Nearly 600 reports upon the value of yellow pine stumpage gave an average of $3.16 per thousand, nearly three times that given by the census for 1899. The reports upon longleaf yellow pine, the most important of the yellow-pine group, ranged from $1.50 to $5 in Florida and Georgia, and from $2.50 to $5.40 in southern Alabama. In southern Mississippi the range was from $2 to $5 per thousand. Practically the same ranges were quoted for southern Louisiana; the average for Sabine and Calcasieu Parishes was $3.79. In the eastern counties of Texas longleaf-pine stumpage values were from $1.25 to $5 per thousand. In Arkansas, the leading shortleaf-pine producing State, stumpage values were quoted at from $1 to $5 per thousand, with an average of approximately $2.50 per thousand.
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> In eastern Virginia loblolly or North Carolina pine was quoted at from $1.50 to $7 per thousand, with an average of slightly more than $3. The range in eastern North Carolina was from $1.50 to $4, with an average of $2.56. The average stumpage price quoted for this species in northern Mississippi was $1.60 per thousand, with a range of from $1 to $3; and in Texas the reports upon the value of loblolly ran up to $2.50.
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> *Cypress.*—The average value of cypress stumpage, based upon 200 reports, was $4.37 per thousand. In Louisiana the extreme quotations were $2 and $10 per thousand, with an average of $4.65 for the southeastern portion of the State, which may be considered fairly representative. In Florida stumpage prices ranged from $1.50 to $12, with an average of $4.14; and in the Mississippi Valley section of Mississippi, from $2 to $5, with an average of $3.69.
>
> *Douglas fir.*—Two hundred and sixty-six reports upon the stumpage value of Douglas fir gave an average value of $1.44 per thousand. State averages ranged from $1.11 in Oregon to $3 in New Mexico. There is but little Douglas fir in New Mexico, however. In the coast and Puget Sound sections of Washington, the great centers of Douglas-fir lumber production, the extreme stumpage prices quoted were 50 cents and $5 per thousand, with an average of about $1.75. In western Oregon the prices quoted were considerably lower, with an average of $1.09 per thousand. Nearly the same values were given for northern California.

However wide the variations, it is always possible to state, roughly, the prices usually paid for a given species in a given locality. Everywhere, and for every kind of timber, these prevailing prices have greatly increased during recent years. Some indication of the movement, though not a full measure of it, is given by the above Forest Service table. According to this table, the average value of Douglas fir and hemlock stumpage nearly doubled during the eight years from

1899 to 1907, that of white pine, white oak, and spruce more than doubled, and that of yellow pine nearly trebled. These six species furnish about three-fourths of the lumber cut in the United States, and yellow pine alone furnishes one-third. It would appear that the people of this country paid to the owners of standing timber, merely as owners, fully twice as much per thousand feet on the lumber cut in 1907 as on that cut eight years earlier.

The ratio of aggregate increase is certainly greater than the ratio of increase per thousand feet. As prices for clear lumber rise, consumers have to take poorer qualities at the prices they formerly paid for good. This poorer timber is such as no one is compelled to use so long as lumber is cheap; and the whole amount of it is an addition to the previous product per acre when rising prices force consumers to content themselves with it. As one of the oldest and largest lumber operators in southern Georgia said to an agent of the Bureau, a sawmill in that region "in the early years, say 30 years ago, cut only the choicest trees, and used only the choicest parts of those trees. A large yield of timber in those days was 2,500 feet to the acre, while the same land, under present methods of cutting, would yield from 6,000 to 10,000 feet to the acre."

Whether prices are quoted by the acre or by the thousand, it is the returns per acre which are important to the owner of timberland. A doubling of the amount cut per acre, with maintenance of the average price on the stump, is as good for him as a doubling of price without increase of product. If both price and product double, the returns increase fourfold.

A similar gain arises from the bringing into use of species for which there has been no market. Up to 1900, and even later, hemlock stumpage had no value on the Pacific coast. It is not many years since old-field pine—pine which has grown on fields which were once cultivated and afterwards abandoned—was valueless in most parts of the South. Now it is an important factor in the market. Gum has become marketable only within very recent years. Reference has been made above (p. 183) to the clearing of hardwood land by deadening the timber. Capt. J. B. White, one of the oldest lumber manufacturers in the South, said in an address at the Southern Conservation Congress, October 8, 1910:

> Even now, in places where the trees have no market, old-fashioned deadenings are still to be seen. * * * I have seen it very recently in some of the Southern States where gum trees can not be marketed.[1]

In the second county northwest of Birmingham, Ala., timbered land could still be bought in 1908, excluding mineral rights, for from

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[1] Pamphlet issued by J. B. White: "Conservation in Relation to Lumbering," p. 8. Reprinted from St. Louis Lumberman.

$1 to $5 an acre, while cleared land, without mineral rights, brought from $5 to $10; that is, the timber was still regarded as an incumbrance. In Bolivar County, Mississippi, in the same year, it was said that the average owner considered the timber of little or no value, and looked upon it as a hindrance to the development of his property. These are the last relics in this country of a condition which has at some time existed everywhere in the eastern and southern forest region.

Every tract and every tree which contains good lumber contains also poor. The price per thousand at a given time is the average price of all the timber, good and bad, which the current conditions of the market make salable. When only the best, amounting on an average acre to less than 2,500 feet, was salable in southern Georgia, the current price per thousand applied only to this 2,500 feet of substantially clear stock. When the price of this clear stock went too high for common uses, poorer stuff, largely from the same trees, became salable, to the extent, according to the veteran Georgia operator quoted above, of from 3,500 to 7,500 feet per acre. Then the price of timber was the average price of the whole 6,000 or 10,000 feet per acre, including the 2,500 good and the 3,500 or 7,500 poorer. For this reason, to say that stumpage sold at 50 cents a thousand at one time and $2 at another gives a false impression. The timber which now sells at $2 is poorer timber than that which formerly sold at 50 cents. Such timber as then sold at 50 cents might now be worth, taken by itself, $3 or $4.

The owner profits by the rise of the best 2,500 feet from 50 cents to $3 or $4. He profits further by whatever he gets for the poorer timber, which formerly he could not sell at all. This second factor, changing the basis on which average prices are reckoned, puts insuperable difficulties in the way of an accurate measurement of changes of stumpage values. The present chapter throws little direct light on this factor, and touches it only so far as the chapter deals with increases of timber values per acre.

At this point it is well to mention the fact that the depression of 1907 did not cause any considerable fall in the price of timberland, however much it may have depressed the price of lumber and the price of logs. Some owners who had to sell got less than they could have got a few months earlier; but owners in general were confident that, by holding on a little, they could get at least as much as ever before, and they had no desire to sell lower. The number of sales was diminished, but few of the stronger timber owners suffered anything more than a postponement of their profits, unless they were manufacturing, and so felt the decline of lumber prices.

This is confirmed by the following passage, from the address of the president of the Yellow Pine Manufacturers' Association, opening the annual meeting of the association in January, 1911:

> During the year I addressed letters to the representative timber holders of the South with whom I had a personal acquaintance and asked that they give me in confidence the value of yellow-pine stumpage. In no instance was there a price less than $3 a thousand feet for shortleaf suggested, or $4 for longleaf, but the average of all of the letters that I had could be summed up in a statement that the holders of yellow pine in the South consider that stumpage values have not declined in the last three years, and that $4 a thousand feet for shortleaf timber and $5 for longleaf are the market values. I am led to believe that none of those from whom this information was secured would have disposed of his holdings at lower figures than the letters would indicate.[1]

Section 6. Stumpage values in the South.

The lumber industry of the Southern Pine Region, on a large scale, belongs almost wholly to the period since the Civil War. It was first developed in the part nearest to the great northern markets—Virginia and North Carolina. Thence it has gradually extended down through the Atlantic States and west through those along the Gulf. It was in full blast in Georgia in the eighties, and it was at about that time that the name "Georgia pine" became well known in the northeastern markets. That name now designates hard or pitch pine, without much regard to origin. Many of the most important southern mills to-day are in Mississippi, Louisiana, and Texas, and much of what is sold as Georgia pine does not come from Georgia.

In a similar way the names "Virginia pine" and "North Carolina pine" are used interchangeably to designate the loblolly of Virginia, North Carolina, and South Carolina.

The longleaf or pitch pine, the source of turpentine and of a great part of the best southern lumber, covered much of eastern North Carolina and South Carolina; much of Georgia and northern Florida; much of Alabama, Louisiana, and Mississippi; and a large area in eastern Texas. Shortleaf pine extended from Maryland through the Atlantic and Gulf States, partly mixed with the longleaf and partly farther from the coast. It covered most of Arkansas and extended into Missouri.

The term "yellow pine" includes the several species of pine in the Southern Pine Region.

A large part of the original stand in most of the Atlantic States has been cut, and the most important areas of virgin yellow pine are now in Florida, Mississippi, Louisiana, and Texas.

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[1] American Lumberman, Jan. 21, 1911, p. 57. See also the statement of W. I. Ewart, quoted above, p. 185.

Virginia and North Carolina.—The following table shows the purchases of timber rights, chiefly in yellow pine, which were made by one company in the North Carolina pine region, from 1895 to 1909, with the company's estimates thereon:

Table 50.—ESTIMATED COST OF STUMPAGE IN PURCHASES OF TIMBER RIGHTS, 1895 TO 1909.

Year.	Quantity (estimated) in M feet.	Cost.	Cost per M feet (estimated).	Year.	Quantity (estimated) in M feet.	Cost.	Cost per M feet (estimated).
1895	16,080	$9,704	$0.60	1903	26,301	$29,857	$1.14
1896	4,235	1,740	.41	1904	64,136	95,771	1.49
1897	87,455	35,135	.40	1905	53,839	111,933	2.08
1898	80,103	56,019	.70	1906	29,922	55,110	1.84
1899	107,910	82,740	.77	1907	4,982	12,150	2.44
1900	28,645	25,047	.87	1908	3,375	9,975	2.96
1901	9,316	8,701	.93	1909	2,985	7,828	2.62
1902	39,593	45,148	1.14				

In 1895–1897 this company made large purchases at an average cost of 43 cents a thousand. During the next four years the average price was approximately 80 cents; during the three years following, $1.31; in 1905 and 1906, about $2; and thereafter, roughly, $2.50 and $3.

The real increase was greater than this, because the timber obtained by the earlier purchases was much more than the estimates. So far as the tracts included have been cut, and so far as the product is reported to the Bureau in such a way that it can be compared with the estimates, the following table shows the results:

Table 51.—ESTIMATED AMOUNTS OF TIMBER ON CERTAIN TRACTS, WITH THE AMOUNTS CUT THEREFROM, CLASSIFIED BY YEARS OF PURCHASE.

Year of purchase.	Estimate.	Cut.		Year of purchase.	Estimate.	Cut.	
		M feet.	Per cent of estimate.			M feet.	Per cent of estimate.
	M feet.				*M feet.*		
1895	2,550	3,774	148.0	1904	24,936	23,534	94.4
1896	460	1,249	271.5	1905	10,142	9,556	94.2
1897	41,075	53,508	130.3	1906	10,085	9,917	98.3
1898	25,648	31,718	123.7	1907	590	824	139.7
1899	29,355	37,198	126.7	1908	1,200	1,353	112.8
1900	4,575	5,997	131.1	1909	2,985	3,426	114.8
1901	4,485	5,539	123.5	Total	166,141	196,605	118.3
1902	4,550	5,487	120.6				
1903	3,505	3,525	100.6				

On the timber bought up to and including 1900, the logs as scaled when cut have exceeded the estimates by nearly 30 per cent, on an average, while on later purchases the scale of the logs has, on an average, nearly agreed with the estimates.

The amounts cut, shown in the table, are the contents of the logs as scaled in the woods. The actual product of sawed lumber has exceeded these results of the log scale by 25, 40, and even 50 per cent, and has considerably exceeded the estimates on the purchases of every year, and doubtless on almost every tract. This, however, does not affect the relation between the earlier and the later estimates.

The earlier purchases stood longer than the later, on an average, between purchase and cutting; and where the timber was immature the actual quantity increased somewhat by growth. It is impossible to measure accurately the degree in which this increased the apparent inaccuracy of the earlier estimates.

Out of the purchases of 1897, tracts estimated to contain 41,075 M feet produced logs to the amount of 53,508 M feet, as scaled in the woods; or 30.3 per cent more than the estimate. If all the timber bought in 1897 gave similar results, the actual cost of the logs would be, not 40 cents a thousand feet, as indicated in the table on page 192, but about 31 cents. Even if, after allowing for the gain by growth, the product exceeded the estimate by only 20 per cent, the actual price per thousand was 33⅓ cents.

The Bureau has no other record of southern stumpage values which is so specific, but it has abundance of testimony to the same general effect. One informant in southern Virginia, in 1908, who gave the current price as $3 to $4 a thousand, according to location with regard to railroad facilities, said that the same timber could have been bought 10 years earlier at 50 cents to $1 an acre, or about 10 cents to 20 cents a thousand. Another told of a tract which was offered to him about 1895 for $3,500, and refused. The hardwood was afterwards sold from it for $8,000, and the pine for $40,000, making a total of almost 14 times the price named in 1895.

It should be borne in mind, as already pointed out, that specific transactions even though numerous do not afford a basis for accurately measuring the general rise in values. Such specific instances are here presented as a matter of interest for what they may be worth.

In eastern North Carolina, one buyer said in 1907 that he had recently been paying about $2 a thousand, while the price five or six years earlier had been about $1. One who had recently paid $20 an acre remembered when similar timber could be bought, say, 12 years earlier, at from $3 to $5 per acre. In a county in western North Carolina, where the prevailing prices in 1908 appeared to be about $5 a thousand for forest pine and $2.50 for old-field pine, it was said that forest pine had been worth about $1.50 in 1898, and that old-field pine had had no value.

South Carolina.—In eastern South Carolina, one informant stated in 1908 that the value of timber had increased 300 per cent in 10 years. Another said that longleaf-pine lands, which were then selling all the way from $5 to $20 an acre, could have been bought 15 years earlier at from $1 to $1.50. A particular tract was mentioned which sold at $2 an acre in 1905 and at $4.75 an acre in 1906. North of the city of Columbia, longleaf pine was quoted at about $3 a thousand in 1908, while it could have been bought 10 years earlier for 75 cents; shortleaf was said to be worth about $1.25 a thousand, while in 1893 it could not have been given away for the cutting and hauling. Still farther northwest, near the edge of the pine belt, pine stumpage was reported to have risen sixfold in 13 years, from about 25 cents a thousand in 1895 to about $1.50 in 1908.

Georgia.—In Georgia $3 a thousand was the commonest value for pine stumpage in 1908. Informants near the Savannah River, naming this price, compared it with $1 ten years before. Near the middle of the State, one lumber company named 50 cents per thousand and $3 per thousand as the prevailing prices for longleaf pine in 1898 and in 1908, respectively. It estimated that oak and hickory had advanced in the same period from $2 per thousand to $3 per thousand. A little farther south it was said that timber rights had been bought at $1.25 an acre in 1898, and were worth about $10 to $15 in 1908. Another informant, near the southern border of the State, said:

> Ten years ago timber could be bought for $1 to $2 per acre, which was 25 cents to 50 cents per thousand feet; now it is worth about $3 per thousand feet.

Because of the closer cutting which accompanies higher stumpage values, this indicates a greater gain to the timber owner than appears on the surface. Three dollars per thousand feet in 1908 was probably equal to from $15 to $25 per acre.

In Clinch County, in southeastern Georgia, one informant said that timberland in fee simple was not worth more than $1.50 an acre in 1898, and was worth $10 in 1908. Another said that timber tracts had increased in value 400 per cent in 10 years. In the neighboring county of Coffee, one informant stated that a tract of 15,000 acres, which he bought in 1906 for $153,000, had changed hands about 1902 at $1.60 per acre, or about $24,000.

One of the lumber pioneers of southern Georgia told the Bureau that when he went there, in 1872, he bought thousands of acres of longleaf yellow pine, land and timber, at 40 cents an acre, and that choice timberland could be bought on the basis of $1 a thousand feet as late as 1899. But few tracts as good are now left, he said, and they are easily worth $4 a thousand.

FLORIDA.—Prevailing prices for pine stumpage seem to be rather lower in eastern Florida than in southern Georgia. Two dollars a thousand was the price oftenest named to the Bureau in 1908. In 1898 the prevailing price seems to have been about 50 cents, and in 1903 not more than $1; one informant said from 25 cents to $1.

In the region north of Tampa, the following prices per thousand feet were named as current in 1890 and in 1908: Pine, 1890, 30 cents; 1908, $2 to $3. Cypress, 1890, $1; 1908, $5.

Near the angle between the Florida Peninsula and the mainland, one company gave the price of pine in 1898 as 25 to 30 cents a thousand, and another as 50 cents to $1 an acre. The latter price would be equivalent to from 15 to 25 cents a thousand. In Taylor County, in this part of the State, one informant declined to pay $9,000, in 1901, for 11,000 acres of longleaf pine; five years later he paid $50,000 for the same tract with 3,000 acres added, and he afterwards sold the 14,000 acres for $120,000. Somewhat farther west, a company valuing its pine in 1908 at $2 to $3 a thousand and its cypress at $3 to $4 a thousand, said:

> Ten years ago this timber was considered inaccessible and had no value in the market.

In central and northeastern Florida, $5 a thousand was considered a normal price for cypress stumpage in 1908 and 1909. One large company, not far from St. Augustine, had offered this price for some cypress tributary to its mill, and had been refused. Most of this company's timber was bought about 20 years ago at prices ranging from $1.25 to $2.50 per acre. These lands cut from 10,000 to 25,000 feet per acre; so the owners, who are now willing to pay $5 a thousand, paid originally 10 or 15 cents on the yield now actually utilized.

ALABAMA.—In Mobile County, Ala., the timber on about 100,000 acres of railroad land was contracted for about 1893, under 15 and 20 year removal clauses, at 50 cents per thousand feet. By 1908, agents of the railroad reported that what was left of it was worth $4 to $5 per thousand. In Monroe County, in the southwestern part of the State, one company stated in 1908 that stumpage had increased in eight years from an average of $1 per thousand to $4 or more for well-located tracts.

All these prices in Alabama are for longleaf yellow pine.

MISSISSIPPI.—In southeastern Mississippi, the value of longleaf-pine stumpage seems frequently to have increased from five to twenty-five fold in 10 years. One informant stated that in his vicinity it was bringing $3 to $4 a thousand in 1908, and that it could have been bought six years earlier for 50 cents. Another, living in a region where most of the holdings are reported at about 6,000 or 7,000 feet per acre, said, in 1907:

> Ten years ago land and timber around here could be bought for $1 an acre. Now stumpage is worth $3 and $4 a thousand.

> I know of 1,260 acres that parties sold six years ago at 60 cents per acre. I have lately tried to buy it at $4 per thousand, stumpage basis, but can't.

A tract of 7,000 acres was offered to a lumber company about 1900 for $5 an acre and was refused. It was sold at $22 in 1906, and in 1907 it was bought at $30 by the company that had refused to pay $5 seven or eight years earlier.

The hardwood in some parts of Mississippi has been transferred within 10 years from the position of an encumbrance to that of a considerable asset. In Yazoo County, northeast of Vicksburg, the statement was made in 1908 that gum had risen within five years from 50 cents a thousand to $2.50. A tract of 6,240 acres, estimated to contain 83,000,000 feet of mixed hardwoods, was bought in 1897 at an average price of $1.50 an acre, or less than $10,000. In 1907, $100,000 was offered for it, and refused. It was contracted for at $124,000 in October, 1907, but the deal fell through on account of the panic.

LOUISIANA.—In various parts of Louisiana pine stumpage sold at less than $1 a thousand down to 1900, and even later. One owner in Vernon Parish bought 3,500 acres of timber rights in 1898 at 75 cents a thousand. He referred to a tract which was offered in 1898 or 1899 at $7 an acre, and was sold in 1904 at $40. Similar tracts, he said, were worth $60 in 1909. Another informant, in Sabine Parish, stated that the current value was about $1 a thousand from 1899 to 1901, while in 1909 it was from $4 to $5.

A tract of about 85,000 acres of longleaf yellow pine, in western Louisiana, was sold early in 1907 for substantially $50 an acre. The secretary of the Yellow Pine Manufacturers' Association stated that an option had been given on this tract 8 or 10 years before at $4.75 an acre, but had not been exercised; and that the timber would cut about 17,000 feet per acre.

A tract of 18,889 acres of yellow-pine timber, in Calcasieu Parish, was sold early in 1909 for $1,125,000, or about $59.50 an acre. About 15,400 acres of this tract was bought from the Government, chiefly in 1881 and 1882, at $1.25 an acre; nearly all the rest had been granted by the Government to the State of Louisiana as school or swamp land. The purchasers estimated the timber at about 16,000 feet to the acre. On this estimate they paid nearly $3.75 a thousand. The price received by the Government in 1881 and 1882 for the part for which the Government received anything was about 7⅘ cents a thousand.

The president of a cypress company in Louisiana stated that most of his company's timber was bought more than 20 years ago at about $2.50 an acre. In 1908, however, he bought 175,000,000 feet of cypress to supply a new mill. This tract had been offered to him in 1894 at $4 an acre. The terms on which he bought it in 1908 were

$6 a thousand feet guaranteed to the seller, and one-fourth of the profits of the manufacturing business. The lands were estimated to cut 17,000 to 18,000 feet per acre.

ARKANSAS.—Shortleaf pine in some parts of southern Arkansas, in small lots, could be bought up to 1907 as low as $2 a thousand, but prices running up to $5 were paid where the seller was in a position to insist on full value. Some large owners valued their holdings as high as $7, but no sales at this price are reported. In the late nineties the current price was from 25 to 50 cents a thousand.

A company which bought a tract about 1880, mostly from the Government, at a cost of $152,000, and has held it since, stated in 1907 that the annual increase in the value of the timber had averaged as much as $152,000.

In the hardwood region of Arkansas, a large holding was bought up for taxes in the early eighties, at an average cost of about 12½ cents an acre, which was increased by litigation, clearing of titles, etc., to 18 cents an acre. Most of this land has since been sold at prices ranging up to $25 an acre. A tract of 20,000 acres was reported to have sold in 1900 for $1 an acre, in 1901 for $3.50, and in 1904 for $13.50.

Section 7. Stumpage values in the Lake States.

The Southern Pine Region may not yet have reached its maximum lumber production; but the lumber product of the Lake States—Michigan, Wisconsin, and Minnesota—entered many years ago on its decline. The reported output of Michigan was 3,012 million feet in the census year 1900, and 1,890 million in 1909; that of Wisconsin, 3,362 million in 1900 and 2,025 million in 1909; that of Minnesota, 2,342 million in 1900 and 1,562 million in 1909.[1] The falling off of the Lake States in white pine, on which their fame as lumber producers has been based, is more striking than the decrease of their total lumber product. The cut of white pine diminished, between 1900 and 1909, in Minnesota, from 2,158 million feet to 1,309 million; in Wisconsin from 2,336 million to 612 million; in Michigan from 1,232 million to 258 million.

MICHIGAN.—For many years Michigan produced far more white pine than any other State, but her great pine forests have nearly disappeared. In 1909 her mills sawed less pine than those of Maine, and only a little more than those of Massachusetts or New Hampshire. The State still produces a large quantity of lumber, but most of it is hemlock and hardwood. In 1909 less than one-seventh of the cut was reported as pine; genuine white pine doubtless furnished far less than one-tenth.

One holder in the northern part of the lower peninsula, whose timber is about one-half maple, one-fourth hemlock, and one-sixth beech, counted the whole worth $6 a thousand in 1908, against $2 ten years earlier. Others indicated lower present values; $3.50 to $4 for hemlock, $3 to $4 for maple, about $2 for beech, with a doubling in 10 years. Twenty years ago, said one holder in the central part of the lower peninsula, tamarack was considered worthless; now it is worth from $2 to $4 a thousand on the stump.

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[1] Twelfth Census of the United States, 1900, Vol. IX, p. 876. Bureau of the Census, "Forest Products of the United States," 1909, p. 56.

The increase of values has been more rapid in the upper peninsula, and present prices seem to be higher; perhaps because the lower peninsula is nearer exhaustion, and the quality of what is left there is lower. "Fifteen years ago," says one upper-peninsula informant, "hemlock and most all hardwoods had no market value. Now the price ranges all the way from $4 to $10 per thousand." Another says: "Elm and basswood were not salable 15 years ago. They are now worth as high as $10 on the stump."

WISCONSIN.—In northern Wisconsin the prevailing prices of white pine, about 1893 to 1898, ranged from $2.50 to $6 a thousand. The Bureau has the record of an important purchase as late as July, 1900, at an average cost of less than $4 a thousand. This purchase covered 31,600 acres, and the price was $800,000. The pine was estimated at 204,418,000 feet; no other timber was estimated at all. If nothing is allowed for the land or for any timber but pine, the average price of the pine is $3.91 a thousand. If the land, with the other timber, be valued at only $2.50 an acre, the average price of the pine is $3.53 a thousand. The prevailing prices for white pine in this region in 1907 are stated at $12 to $14 per thousand feet.

In Washburn County, in northwestern Wisconsin, jack pine is said to have been worth nothing in 1898, and $4 to $5 a thousand in 1908; Norway pine $1 to $4 in 1898, and $6 to $7 in 1908.

In Wisconsin, as in Michigan, hemlock is now the principal element of the lumber product. Up to about 1895, hemlock stumpage hardly had a market value. In 1898 it had to be well situated to command $1 a thousand. By 1907 it was worth $4 to $5 a thousand.

Basswood, which sold at about $1 a thousand in the middle nineties, now costs $8 and $10. Soft elm, which was then worth about 50 cents, is now $4. Rock elm, which was $1, is $10.

The president of a Wausau company gave the following as the average values of pine and hemlock stumpage, per thousand, from 1902 to 1908:

Year.	Pine.	Hemlock.	Year.	Pine.	Hemlock.
1902	$4.00	$0.75	1906	$9.00	$2.00
1903	5.00	1.00	1907	10.00	3.50
1904	6.00	1.50	1908	10.00	3.50
1905	8.00	1.50			

In June, 1910, this informant estimated the value of pine stumpage during the preceding winter at $9, and that of hemlock at $2. He reached these figures, as he says, by deducting the cost of logging from the price paid for logs, in "a territory where competition was strong." He adds:

> Stumpage is being held at a higher price, but there is none being sold, which is a very good evidence that it is being held for more than it is worth at the present time. * * * Although as a matter of fact, people do not like to sell their stumpage at a less price than what they considered it worth three years ago, in spite of the fact that lumber is selling at a considerably less price; so the price I gave you is about right for the actual value, compared with the price of lumber at this time.

This informant's observation would seem to be, therefore, that in some cases, where the owners were led to sell by some special consideration, timber could be bought at about $9 for pine and $2 for hemlock, which the informant considered the "actual value compared with the price of lumber at this time;" but that owners in general held their timber at about the prices of 1907, which he reports as $10 for pine and $3.50 for hemlock.

One company bought 2,000 acres of hemlock and mixed hardwoods at from $1.25 to $3 an acre, according to location, in 1894, and sold it in January, 1908, at $30. Another bought 160 acres at $5, for land and timber, in 1891, and sold the timber rights only, in 1904, at $22. The same company "bought hemlock lands in 1891 for 50 cents per acre, simply to get the hardwoods. The same class of lands are worth $20 per acre to-day."

MINNESOTA.—In 1909 over four-fifths of the lumber cut in Minnesota was white pine, and Minnesota produced about one-third of the white pine cut in the United States.

The State contains hardly any hemlock; and the other less important conifers, such as jack pine, spruce, and tamarack, were regarded as worthless in the early days of the lumber industry, and are now put in with the white pine, under the trade name of "northern pine." Out of these conditions has grown a custom, in the northern part of the State, of counting only the white pine, when stumpage is sold at so much a thousand, and throwing in the others. So far as this custom is followed, it tends somewhat to exaggerate the current price of pine, since the amount paid nominally for 10,000,000 feet of pine may tacitly include 1,000,000 or 2,000,000 feet of other timber. On the other hand, if the minor woods are included in the statement of quantity, and one price is fixed for all, the increase of stumpage values is partly hidden. Spruce and tamarack are less valuable than white pine, and a price per thousand based on the full quantity of all would be lower than a price made for pine alone. These influences have been felt chiefly in recent years, because the minor woods were valueless before, and did not in any way come into the reckoning. The masking of higher prices, however, by the inclusion of inferior woods in the count, is a phase of a process which goes on wherever the forests are depleted. Everywhere, as timber grows scarcer and values rise, smaller trees and poorer trees are counted in the estimates. The thousand feet which sells at $5 now is often not so good as the thousand feet which sold at $2 ten years ago.

The State of Minnesota has for many years sold timber from its State lands at public auction, and the records of its sales are of considerable importance in a study of the course of stumpage values. The table below covers all sales, except small lots below 100,000 feet, from 1880 to 1909. The table shows the total number of feet actually cut from the tracts sold each year, as scaled by the surveyor general, the aggregate sum paid therefor, and the average payment per thousand feet. For a part of the sales, the estimates made on behalf of the State before the sale, as well as the quantity of logs afterwards cut and scaled, are known. For these sales the official estimate of standing timber and the official scale of the logs, with the ratio between them, have already been given in Table 2, on page 50.

TABLE 52.—TIMBER SOLD BY THE STATE OF MINNESOTA, 1880-1909.

Year.	Scale in M feet.	Total price.	Average price per M feet.
1880	19,508	$28,625.02	$1.47
1881	14,868	24,026.00	1.62
1882	21,808	34,249.70	1.57
1883	28,012	49,700.17	1.77
1884	6,662	14,045.92	2.11
1885	5,213	9,013.25	1.73
1886	48,695	106,834.42	2.19
1887	44,701	104,998.57	2.35
1888	31,662	80,269.25	2.54
1889	56,467	122,950.75	2.18
1890	65,653	148,019.60	2.25
1891	192,869	412,251.75	2.14
1892	73,351	138,894.80	1.89
1893	46,426	85,190.20	1.83
1894	50,944	91,781.40	1.80
1895	41,025	89,439.25	2.18
1896	1,758	$3,625.00	$2.06
1897	72,460	182,626.20	2.52
1898	42,688	121,961.05	2.86
1899	3,484	9,208.00	2.64
1900	72,027	372,480.00	5.17
1901	29,565	175,354.25	5.93
1902	53,922	451,957.10	8.38
1903	82,045	493,959.80	6.02
1904	36,718	283,207.95	7.71
1905	106,713	766,663.45	7.18
1906	47,227	425,099.09	9.00
1907	[1] 27,621	[1] 216,408.00	7.83
1908[2]	....	....	....
1909	[3] 37,026	[3] 278,744.50	7.53
Total	1,361,118	5,321,584.44	3.91

[1] Including 490 M feet, estimated stand on one tract not cut, and the value of the same at the sale price, $6 per thousand feet.

[2] No sales.

[3] Including 31,485 M feet, estimated stand on tracts not cut, and the value of the same at the sale price.

The prices indicated by this table are subject to the same criticism as almost all other series of stumpage prices—that the thing valued is not continuously the same. Successive sales have covered timber farther and farther toward the remote north end of the State. At the beginning of the period covered by the table, most of the timber sold was within 75 or 100 miles of St. Paul. In recent years much of it has been more than 200 miles from St. Paul. Till recently, nothing but white pine was counted. Now, Norway pine, jack pine, spruce, tamarack, and balsam are all counted, and all sold at the same price. This is nominally the price of white pine, but it must necessarily be affected by any considerable admixture of less valuable woods.

When the quantity sold in a year is small, the price is especially likely to be erratic. It may represent the special advantages or disadvantages of a particular tract. When the total quantity is large, the special circumstances of any single tract disappear in the general average.

The prices rose almost steadily from 1880 to 1888, receded till 1894, and made only a moderate gain up to 1899. The returns that year were $2.64. The sales were very small, but the average price for the preceding year, with larger sales, was only $2.86. In 1900, however, prices practically doubled, rising to an average of $5.17, and from that time there has been a general upward movement. In 1906 timber which scaled 47,227 M feet was sold at an average of $9. There was a slight recession to $7.83 in 1907 and $7.53 in 1909.

The prices recently obtained by the State have perhaps run higher than the prices obtained by small owners. The agents of the Bureau were repeatedly told by lumbermen that the prices of State timber were above those prevailing in the market. The State is a large owner, able to deal with large buyers on equal terms. Its timber is sold at public auction, after wide advertising. The prices it has received approximate what strong sellers have obtained from strong buyers, in the localities where the State has made its sales. They do not show the changes in the value of any one piece of timber.

Section 8. Stumpage values in western Montana, northern Idaho, and eastern Washington.

The important forest region in western Montana, northern Idaho, and eastern Washington produces timber wholly different from that of the Pacific coast. In Washington west of the Cascades the prevailing tree is Douglas fir. Along the east slope of the Cascades there is considerable Douglas fir mixed with western pine, but in northeastern Washington, in Idaho, and in Montana Douglas fir is of minor importance, the bulk of the lumber cut being western pine, white pine, and larch.

MONTANA.—The Big Blackfoot Milling Company bought the bulk of its timber from the Northern Pacific Railway, in 1899, under a contract which required it to take every forty on which the agreed estimate showed as much as 25,000 feet. The price was 50 cents a thousand. The estimates were so low that this meant probably not more than 30 cents a thousand for the actual product.

The Helena National Forest in Montana has been receiving $5 to $6 a thousand for piling, on the stump. This is for straight, perfect trees, 12 to 22 inches in diameter at the butt, and 35 to 40 feet long. The Big Blackfoot Milling Company was paying the Government $3 and $4 a thousand in 1909 for timber from the national forests, but complained that it could make no profit on it, because the price was too high, the scale was too close, and the requirements as to logging and piling the brush were too onerous; "piling the brush alone costs nearly $1 a thousand."

These prices are doubtless somewhat exceptional. Yet the Forest Service obtained for Montana timber, during the fiscal year 1907–1908, an average of $5.68 a thousand for 3,000,000 feet from the Yellowstone National Forest, an average of $2.95 a thousand for 51,000,000 feet from Lewis and Clark, and an average of $2.28 for 105,000,000 feet from all the national forests in the State.

The prevailing price secured in 1907 and 1908 by the State of Montana was about $2.50 to $2.75 a thousand, though as much as $4.50 was obtained for some exceptionally well-located tracts. By a law of 1909 a minimum price of $3 a thousand was fixed for timber owned by the State.

Both the Government and the State do much better than the small owners. The Big Blackfoot Milling Company, while it was paying $3 and $4 to the Government, paid from 50 cents to $1.50 for small lots. With one other less important interest, this company dominated the lumber business of Montana, except in the far northwest corner. Occasionally a speculator would get together a tract of such size and such situation that the company wanted it; then a better price would be paid. For one round lot of 100,000,000 feet, exceptionally well situated for logging, the company did pay, in 1907, $2.50 a thousand; but the president said in 1909 that this was the highest price it had paid except to the Forest Service.

One informant states to the Bureau that in 1897 he could have bought Northern Pacific timber on Thompson River, in Sanders County, now estimated at 870,000,000 feet, for $151,000; and that on the Lolo, in Missoula County, estimated at 152,000,000 feet, for $25,000. These prices are about 17 cents a thousand on the estimates. The 100,000,000 feet just referred to as sold by a speculator to the Big Blackfoot in 1907 at $2.50 a thousand was on the Lolo, in Missoula County, in even numbered sections interspersed between the odd numbered sections of the Northern Pacific timber here spoken of. That tract, as noted, was exceptionally well located.

IDAHO.—The same informant stated that in 1897 he could have bought Northern Pacific timber in Idaho, now estimated at 700,000,000 feet, for $70,000, which would be 10 cents a thousand on the present estimate.

In the middle part of Idaho, about the latitude of Lewiston, the situation is much the same as in the middle and southern part of western Montana. Two companies control the timber, each within a well-defined territory of its own. They do not compete with each other, and they have so far absorbed the timber that no one else can compete with them. Under these conditions, they were in 1909 maintaining a nominal price of about $1 a thousand. The stumpage cost per thousand of actual product was likely to be much less, because the quoted estimates of amounts of stumpage were likely to be far below the truth. An agent of the Bureau saw the sale of one claim, estimated by the owner to contain 2,600,000 feet. The buying company's estimate of this claim was 3,100,000 feet, but it represented to the owner that its estimate was 2,250,000 feet. The claim was bought for $2,350; a little more than $1 a thousand, according to the buyer's statement to the owner, but about 75 cents, on the basis of the buyer's actual estimate. The seller afterwards told the agent of the Bureau that he had been offered $3,150 for the claim four years before, but that only the one company would bid on it now, and he had to take $2,350 or not sell.

In the extreme north of Idaho and the extreme northwest of Montana, somewhat higher prices are quoted than in other parts of the Inland Empire; in 1908, 75 cents to $1.50 for larch and fir, $1.25 to $2.50 for western pine, and still more for white pine. A small company in the northernmost county of Idaho made purchases as follows:

Year.	M feet, estimated.	Average cost per M feet of estimate.
1905	5,225	$1.71
1906	32,915	2.10
1907	20,975	$2.29
1908	5,465	2.00

Not quite half of these purchases included the land, and the rest covered timber only; but the prices were not apparently affected by the exclusion or inclusion of the land. The estimates were probably so low that the average payment per thousand feet of logs actually cut from the tracts purchased would hardly equal more than $1.25 in 1905, and $1.50 to $1.70 in the later years. In 1909 this company paid the Government $4 a thousand for white pine and $2 for larch and cedar, and doubtless paid on a full scale. In that year one informant reported private timber selling as high as $2.50 for tamarack, cedar, and fir; $3 for western pine and spruce; and $4 for white pine. These were nearly the prices the Government was getting, and were undoubtedly above the usual payments to small holders. One man sold an exceptionally fine and well-situated lot of 60,000,000 feet of western pine in the spring of 1909 at $3.65. He considered that the timber of the Inland Empire generally was not worth $2 a thousand, on an average.

A tract of about 30,000 acres in northern Idaho was picked up in 1901 and 1902 at a total cost of $240,000; sold in 1902 for $900,000; and in 1909 sold for $2,500,000, or more than ten times what it cost in 1901 and 1902.

EASTERN WASHINGTON.—One informant did not value the timber of Stevens County, which occupies the northeastern corner of Washington, at more than 75 cents a thousand. Others said that Stevens County timber could have been bought 10 years before for 25 cents a thousand, but would now cost from 50 cents to $3, according to accessibility. Speculators have been picking up timber in that region at about $1 a thousand. One exceptionally fine tract of white pine in Stevens County, 2,560 acres, estimated at 30,000,000 feet, was sold in 1908 for $75,000, or $2.50 per thousand on the estimate. The comparatively high price was due partly to the quality and the situation of the timber, and partly to the size of the holding, which gave it some importance. In Ferry County, next west of Stevens, one small company bought 20,367,000 feet of pine in 1906, at a total cost of $20,272, or practically $1 a thousand. The land went with the timber, and so did a considerable quantity of larch and fir, which was not considered in reckoning the price. All was in 160-acre claims, except one purchase of 320 acres. Nearly all was bought at $1 a thousand on the estimate; probably equivalent to 60 or 70 cents a thousand, for the pine only, on the scale of the logs. In Stevens County the same company made purchases of small lots, from 1905 to 1908, amounting in the aggregate to about 100,000,000 feet, at prices ranging from about $1 to about $2 a thousand on the estimates.

The greater part of this timber is western pine. There are smaller quantities of larch and fir, a little white pine, and a little miscellaneous timber.

A tract of 60,000 acres in Stevens County was bought from the Northern Pacific Railway Company, in 1901, for $127,500, and was sold in October, 1906, for $500,000. The original purchasers estimated the timber at 310,000,000 feet. This was said to be double the Northern Pacific cruise, but was far below the estimate of the later owners. On this estimate the price of 1901 was 41 cents a thousand, and that of 1906 was $1.61—nearly four times as much.

On the whole, the market value of any given tract of timber in western Montana, Idaho, or eastern Washington, taken at random, is perhaps likely to be 4 or 6 times as great in 1911 as it was in 1900; but those who gathered considerable holdings about 1900, by picking up small tracts at the prices then current for small tracts, might now, in some cases, sell for 10 or 15 times what they paid.

Section 9. Stumpage values on the Pacific coast.

WESTERN WASHINGTON.—So recently as the years 1902–1904, timber operators were still absorbing large quantities of timber in Washington which till then was owned by the United States. Under the timber and stone act alone, nearly 600,000 acres in the State were taken during those three years. Men used to take up 160-acre claims, and pay the Government $2.50 an acre, or $400 per claim. Some purchasers got 10,000,000 feet or more; and in such cases the cost was 4 cents per thousand feet or less. Most of the claimants sold their lands to speculators at from $600 to $1,500 per claim. For instance, in 1891 a speculator bought 160 acres in King County for $800. He estimated that it contained between 7 and 9 million feet, of which half was cedar. He held it till 1909, and sold it for $18,500. So late as the years from 1903 to 1907, a tract of 8,000 acres, in Clallam County, west of Puget Sound, was picked up from claimants at an average cost of about $1,220 per 160-acre claim, or a total cost not far from $61,000. The timber was estimated in 1907 at 472,000,000 feet. The cost to the speculator, on this estimate, was a fraction under 13 cents a thousand. The tract was sold, in June, 1907, for $200,000, and soon after the speculator had closed this bargain he received an offer of $280,000. The price he sold at was 42 cents a thousand on the estimate; the price afterwards offered was 59 cents.

In general, the less accessible timber has sold in recent years at from 50 cents to $1 a thousand, but most of the tracts which go at such prices are small. What gets into the hands of the larger owners is likely to stay there till it commands more. One company bought a holding of 100 million feet, 25 or 30 miles southeast of Tacoma, in 1907, at $1 a thousand, and about the same time picked up 18 million feet in small lots at an average cost of 81 cents. The Milwaukee Land Company, which made very extensive purchases of inaccessible timber about the same time, buying almost exclusively from small owners, is understood to have paid an average price of about 80 cents. Mr. George S. Long, manager of the Weyerhaeuser Timber Company, stated in a public hearing before the Pierce County board of equalization, in August, 1908, that the Milwaukee company had "purchased in 1906 and up to September, 1907, six billion feet at less than 80 cents."

Small lots, in accessible situations and for immediate cutting, have sold in the general market during the last three or four years for about $2 a thousand. Probably not many small holders have received more. The larger owners, however, have got $2.50 or more for fairly accessible tracts.

In April, 1910, Mr. George S. Long, manager of the Weyerhaeuser Timber Company at Tacoma, published some comments on the rise of timber values. The occasion was the report of a legislative committee on the disposition of timber lands belonging to the State of Washington. Mr. Long said:

> The case is cited of three quarter-sections of land purchased by the Weyerhaeuser interests in section 16, township 16 north, range 5 east, being a total of 480 acres, sold [by the State] in June, 1901, at public auction for $7,087.50. * * * During the years 1900 and 1901 the Weyerhaeuser interests were offered and purchased from the different homesteaders and claimants in that township an aggregate of 4,751 acres, which cost on an average $11.17 an acre. At the same time the State lands referred to above were advertised for sale, and the Weyerhaeuser interests purchased them at an average price of $14.76 an acre. It is apparent from this that the State got at least $3.50 an acre more for the lands which it sold than did the various 35 or 40 people who sold other lands immediately surrounding the State lands in the same township and at the same time.
>
> In the year 1900 township 16 north, range 5 east, which is near Eatonville, was a remote and inaccessible region so far as transportation was concerned, and since then the Tacoma Eastern Railway has been built within a few miles of this township, which makes it available for an early operation.
>
> Not only were homesteaders and timber claimants selling timberland at low figures 10 years ago, but everybody else who was selling timberlands and anything else in Washington. As an illustration, the London and San Francisco Bank, one of the richest corporations engaged in the banking business at that time on the Pacific coast, sold to the Weyerhaeuser Timber Company, in the year 1900, 10,000 acres of choice timberlands near Centralia, Wash., at an average price of $9 an acre, and were exceedingly glad to have the opportunity to make the sale.
>
> Ten years ago the so-called Tower-estate lands, consisting of about 40,000 acres, situated largely in Lewis and Cowlitz Counties, were offered for sale at $8 an acre and found no takers.
>
> These prices seem ridiculously low in the light of recent events.[1]

The timber in township 16 north, range 5 east (the first piece mentioned), probably runs about 70,000 feet to the acre, and the second piece, purchased from the London and San Francisco Bank, probably runs about 50,000. On these estimates, the State land referred to cost the Weyerhaeuser interests about 21 cents a thousand; the homesteads and claims, an average of about 16 cents; and the London and San Francisco Bank purchase, about 18 cents.

As far back as 1882, $20 an acre was paid for a tract of about 2,250 acres in Wahkiakum County, near the Columbia River. The tract was held till the spring of 1909, and then was sold at $3 per thousand, on an estimate of about 50,000 feet to the acre, making the price per acre about $150. On the estimate of 1909, the price paid in 1882 was about 40 cents a thousand.

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[1] Mississippi Valley Lumberman, Apr. 22, 1910, p. 25.

All these reports relate to the region west of the Cascade Range, where far the greater part of the timber of Washington lies. Some timber, however, stands on the eastern slopes of the Cascades. This runs largely to pine; the Douglas fir is much less important east of the mountains. In Klickitat County, on the southern border, a tract of 46,000 acres, containing 500 million feet or more of western pine, was offered in the fall of 1909 for $675,000; about $14.65 per acre, or $1.35 per thousand feet. Farther north, in Kittitas County, a lumber company began operations in 1902, and its stumpage up to 1906 cost less than $1 a thousand. It has since paid much higher prices; as much as $3.25 a thousand for a quarter section on the headwaters of the Yakima River. But—as illustrating the differences of value which result from small differences of location—it refused in the spring of 1909 to pay more than $600 for a quarter section, estimated to contain 2,700,000 feet of timber, and lying in the same township with the quarter for which $3.25 a thousand was paid, and only 3½ miles from the stream. Six hundred dollars for 2,700,000 feet is 22 cents a thousand. The owner refused the offer, but he would have sold for $900, or 33 cents a thousand. In explanation of the great difference of price between two tracts a few miles apart, the company says that the first quarter was logged at a cost of $2 a thousand feet, while it estimates the cost of logging the second quarter at $7 a thousand.

It is a common statement of timbermen on the coast that the value of stumpage trebled in 10 years from the later nineties, and about 15 cents a thousand is given as the prevailing value in the eighties. The weight of evidence indicates that the increase in 10 years ending about 1907 averaged more than threefold. Many specific instances could be cited where the advance was tenfold or more. One company paid $110,000 in 1909 for a section which was sold about 10 years earlier for $10,000. Another sold six claims in 1900 at $1,000 each, bought them back in 1907 at $15,000 each, and sold them again in 1907 at $16,000 each. In 1900 the Northern Pacific sold a section, estimated to contain 32,000,000 feet, for 37 cents a thousand, or $11,840. In 1907 this section sold for $115,000.

In many instances the later prices are based on much larger estimates than the earlier. The earlier estimates disregarded a large part of the stand. Hemlock was not counted at all till within six or eight years. In the eighties no tree of any sort was counted that did not measure 18 or 20 inches in diameter at 20 feet from the ground. Nothing smaller was scaled at the mills. No log above the first limb was considered, and trees even slightly defective were thrown out. In some places the timber was nearly all mature; here the difference between former and present estimates may be comparatively small. In other localities there is much "sapling" timber; and here the old estimates may be doubled or trebled. One informant states that he sold a tract of 250 million feet in Whatcom County, in 1896, at 10 cents a thousand, and that a present-day cruise would be more than double that which he sold on. An old cruiser for the Northern Pacific states that, in the Puyallup region in Pierce County, the maximum cruise to the forty in 1888 was 400,000 feet; now it is 1,000,000 to 1,200,000 feet. He cites, as an exceptional instance of this increase, a section in Pierce County, which he cruised for the Northern Pacific in October, 1888, at 1,480,000 feet, and for the county in 1908 at 17,041,000.

The great Weyerhaeuser purchase.—The course of timber prices in Washington shows well the effect of "strong hands." One of the most spectacular events in the timber history of the country was the purchase of Northern Pacific timber lands by the Weyerhaeuser Timber Company. The Weyerhaeuser company was organized for the very purpose of holding timber for the speculative profit to be gotten out of it. Not that it refuses to sell; but it holds a stiff price, and its usual policy is to sell only to mills for present cutting. It is strong enough to reserve all speculative profit for itself.

The big purchase was made in 1900, and the price understood to have been paid was equivalent to about 10 cents a thousand for the lumber which the holding will actually produce. Mr. F. B. Lynch, a well known timberman of St. Paul, made the following statement at the tariff hearings before the Ways and Means Committee, November 20, 1908:[1]

> We were offered the timber that the Northern Pacific Railroad sold to the Weyerhaeuser people—I do not say we were offered it, but we put in a bid for it and the Weyerhaeuser people got it—and the price of that timber, on the Northern Pacific estimates, was less than 20 cents per thousand.

The Northern Pacific estimates do not, upon the whole, exceed half the output, and a price of 20 cents on those estimates would not exceed 10 cents on the actual product of lumber.

It is universally agreed that the Weyerhaeuser purchase was followed by a marked increase of timber prices, and that this great holding exerts a continuous stiffening effect upon the market. A large holder in Chehalis County says that only the most accessible timber there would have brought $1 a thousand, and a great deal would have brought nothing, up to 1900, when Mr. Weyerhaeuser made this great purchase. "This caused the stumpage in the county to have a value." Another prominent man in the Gray's Harbor country says:

> Prior to the time the Weyerhaeusers came in here about 10 years ago, when they purchased the Northern Pacific Railway

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[1] Tariff Hearings, 60th Cong., p. 862.

> lands, a large amount of the stumpage had no value at all. Only the most accessible timber would bring $1 per thousand. Weyerhaeuser purchased from the Northern Pacific Railway at 10 cents per thousand. This caused the stumpage in the county to have a value, and in five years the average value of stumpage was $1 per thousand feet. During the last five years it has steadily increased until the average value is now $2.50 per thousand feet.

OREGON.—A large holder of Oregon timber, who has bought about 150,000 acres in the State and who says that he has paid out over $40,000 for the mere cruising of his land, makes the following statement:

> There was a general depression in the price of timberlands from 1896 to 1900. During this period values remained constant and were very low. About 1900 values began to rise and have constantly advanced since that time. The price of stumpage land in Oregon depends greatly upon its location; for example, that part of Oregon known as the Columbia River district and that part in the interior of Oregon known as the Willamette Valley. There is also a large district around Coos Bay. The most rapid advance has been in the Columbia River district, where a number of mills are located and the supply of timber has been rapidly exhausted. Ten years ago timber could be obtained at 75 cents per thousand feet, and on the same cruise at the present time this timber could be sold at $2.50 per thousand feet. I believe that these figures are quite conservative. In the Willamette Valley 10 years ago timber could be purchased at from 30 to 35 cents per thousand feet, and to-day on the same cruise it would be worth $1 per thousand feet. When I speak of the timber in the Willamette Valley I mean that timber which is distant from a railroad and for which at the present time there is no outlet. Around the Coos Bay country 10 years ago timber could be purchased at $1.65 per thousand feet, and on the same cruise it could to-day be sold at $3 per thousand feet.

The change of values during the last 5 or 10 years has probably not been exceptionally great in the immediate vicinity of the Columbia River. There logging began earliest, and there stumpage first attained a substantial value. Back from the river, even in the river counties, timberland had little value till after 1900. In the southwestern part of Columbia County, the second river county from the ocean, the best timberland is said to have sold about 1902 at an average of $10 an acre, or about 20 or 25 cents per thousand of estimated stand. By 1908 this timber was selling at $1 a thousand.

In the southern part of Clatsop County, which borders the river at its mouth, one informant thinks that values have multiplied by 20 since 1897. In those days, it is said, plenty of 160-acre claims, with more than 11,000,000 feet of timber apiece, could be bought at $500, and many sold for less. Up to about 1903, 160-acre claims usually sold for

$800 to $1,200. In 1907 a company bought 36 claims, mostly of 160 acres each, in the southwestern part of Clatsop County, at from $2,000 to $4,000 per claim, or $12.50 to $25 an acre. The prices per thousand feet of timber, as estimated, ranged from 30 cents to 50 cents, with an average of 40 cents. This tract, though near the sea, is not accessible to the river nor to any good means of transportation. Another tract in this county, 6,040 acres, was sold about May 1, 1910, for $500,000. The seller estimated the timber at approximately 350,000,000 feet, and considered that he received about $1.40 a thousand. He bought the tract in 1907, at 65 cents a thousand, on a somewhat lower estimate.

A holder in the next county south of Portland names the following ranges of value:

	Per M feet.
1898	$0.10-$0.50
1904	1.00- 1.50
1908	2.00- 2.50

These prices, he adds, apply to good large bodies of timber, well located. Small bodies could have been bought for much less, at any time during the 10-year period.

Comparisons of prices per thousand give an inadequate idea of the actual rise in value of timberlands, because of the "safe" or "conservative" character of the estimates, and especially of the earlier ones. A tract in Clatsop County, estimated at 300,000,000 feet, was bought about 1899 for $500,000. The buyers have now been cutting from it for several years. By 1909 they had cleared more than $500,000 from it, over and above all expenses, and they then estimated that they had at least 300,000,000 feet of timber left. A tract of 5,425 acres, assembled from claim holders at about $700 per 160-acre claim, or for about $24,000 in all, was estimated in 1892 at 60,000 feet to the acre. In 1907 it was estimated at 90,000 feet to the acre, and was sold for $460,000.

A tract of about 3,500 acres, in Washington County, the next county west of the city of Portland, was assembled from the claim holders in 1896 at about $800, or in a few cases as much as $1,000, per 160-acre claim. In 1906 it was sold at $65 an acre, $10,400 a claim, on an estimate of 60,000 feet per acre. In 1908 it was sold on an estimate of 87,000 feet per acre, at $1.25 a thousand. The last sale was at the rate of $108.75 an acre, $17,400 a claim.

A tract of a little more than 9,000 acres, in Tillamook County, west of Washington County, was assembled from the claim holders prior to 1892. In 1892 it was sold for $23,000. In 1906 it was sold for $255,000. In 1908 an offer of $500,000 for it was refused.

In Marion County, the second county south of Portland, a tract of 19,600 acres was bought in 1900 at $8 an acre, and sold about 1903 at

$24 an acre. The estimated stand was 1,500,000,000 feet, or about 76,500 feet per acre. On this estimate, the price per thousand was about 10 cents in 1900 and about 31 cents in 1903. A tract of 9,000 acres, in Clackamas and Marion Counties, was bought in December, 1906, at $27 an acre, and sold in 1907 for $750,000, or about $83 an acre. The timber was estimated at 1,000,000,000 feet. On this estimate, the first price was 24 cents a thousand, and the second was 75 cents.

In Lane and Douglas Counties, in the southerly half of western Oregon, fir and cedar are said to have been worth 10 cents a thousand, or less, in 1898, and 50 cents to $1, according to location, in 1908. The Bureau's record of sales in 1909 and 1910 covers prices from 50 cents to $1, on the basis of estimated stand. One informant says that the general price was $1.25 an acre for school lands and $2.50 an acre for other land in 1898, and that in 1908 the price ranged from $12 to $30 an acre, according to location and natural advantages. A tract of 36,000 acres, bought in small lots from 1901 to 1903 at prices ranging from $6 to $10 an acre, was sold about the beginning of 1907 at $20 an acre.

East of the Cascade Range, most of the timber will be inaccessible till railroads are built to it. Its value is therefore speculative, and ranges from $1 a thousand down. In the Blue Mountain region, particularly in Grant County, the average price of timber 50 miles from a railroad was given in 1908 as 75 cents a thousand.

CALIFORNIA.—In California the bulk of the lumber cut is furnished by the several species of pine in the interior, and by redwood on the coast. The pines rank considerably higher than fir in the lumber market, and redwood ranks somewhat higher than fir; but only part of the difference appears to be reflected as yet in the prevailing prices of stumpage.

In the extreme northeast, where transportation facilities are lacking, prices have continued very low. One of the highest prices reported from that region is $6.75 an acre, paid in 1904 or 1905 for a tract of 47,000 acres, estimated at 14,000 feet per acre. One company, whose holdings are estimated to average 16,000 or 17,000 feet to the acre, bought them between 1905 and 1908 at an average cost of $5 an acre, or about 30 cents a thousand. This land is said to have been worth practically nothing before 1900. Five dollars an acre is said to have been the price most commonly paid in assembling one of the largest individual holdings in the country, which lies in northeastern California.

Somewhat similar conditions are reported from the more southerly parts of eastern California, in or near the Sierra Nevadas. A tract near the Yosemite, 160 acres, estimated to contain 4,000,000 feet, three-fourths pine, was bought in 1908 for $700, or 17½ cents a thousand. Other recent purchases are reported at 25 and 30 cents a thousand. One tract of about 20,000 acres, however, estimated at about 50,000 feet per acre, in Tuolumne and Mariposa Counties, was assembled in 1900 at an average cost of $18 an acre, and sold in 1905 at $35. A railroad has now been built near this land, and an offer of $100 an acre has been refused for it. These prices are about 35 cents, 70 cents, and $2, respectively, per thousand of estimated stand.

The prices of 25 and 50 cents a thousand are for timber which is at present inaccessible, and which is not likely to be reached by railroads, so far as the public knows, for many years. One company reports paying $1 a thousand for timber in Calaveras County, southeast of Sacramento, easily accessible to their mill but hard to log. This company paid $6 an acre in 1902, or 30 cents a thousand, for land estimated at 20,000 feet to the acre. Some of this company's land was bought in 1882 at $2 and $2.50 an acre. A holding of 25,000 acres in Calaveras County was sold during 1909 at $25 an acre. The average stand per acre is put at 20,000 to 22,000 feet; and about 30 per cent of the timber is sugar pine—one of the most valuable species on the Pacific coast—about 45 per cent yellow pine, and only about 25 per cent the less valuable fir. Other owners in the same part of the State bought land which they estimate at 30,000 feet per acre, in 1893, at $6 an acre, equivalent to 20 cents a thousand. They doubt whether the land could have been sold during the following 10 years for what they paid. So late as 1903 they bought additional tracts as grazing land; the timber was hardly valued. From 1903 to 1908, they say, the value trebled.

In the northern part of the valley east of the Coast Range, near the railroad which comes down from Oregon, somewhat higher prices prevail. One company reckons its timber at $2 a thousand, on an average. Another, whose timber is fairly accessible, values it as follows:

	Per M feet.
Red fir	$1.00
California white pine	1.50
Sugar pine	2.00
Average, all species	1.40

Timber must apparently be near a railroad to bring $2 a thousand.

In some parts of Trinity County, a region without railroads, mountainous, and bounded on the east by the crest of the Coast Range, purchases were reported in 1909 as low as $6.50 per acre.

Some informants near national forests say that the local price of timber is largely determined by the price the Government charges. One, in Placer County, says that before the establishment of the national forests in that region the value of timber was $1 or $1.50 a thousand; but the Forest Service has fixed its prices at from $1.25 to $4, and private owners will not take less than the Government is charging. Others, in Placer County and in Nevada County, next north, make similar statements. In the general upward movement, however, it is not possible to determine how much effect the Government's example may have had on the ideas of other holders or of buyers. A company which owns 8,000 acres in Placer County within the national forest, valued its property at $17.50 an acre in 1908, and said that it began buying in 1901 at $5. This is not a greater increase than appears in many places where no special governmental influence is alleged.

In the redwood belt, on the coast above San Francisco, values perhaps trebled or quadrupled in 10 years. Nominal prices ranged in 1908 from $1.50 to $3 a thousand, according to character and accessibility. The usual figures 10 years earlier seem to have ranged from 50 cents to $1.

A redwood tract of about 30,000 acres, in Del Norte County, was sold in 1898, on an estimate of at least 100,000 feet per acre, at an acre price of $55. The actual stand is probably about 150,000 feet per acre. The price paid in 1898 was about 50 cents a thousand on the 1898 estimate, but materially less on the actual stand.

A holding of 30,000 acres in Humboldt County was assembled about 1902 to 1904, at from $8 to $20 an acre, and is now held at $150 an acre. It must be remembered that in the redwood belt the average stand per acre is enormous. The holding in question will probably average 100,000 feet of redwood to the acre.

Another 30,000-acre tract, in the northern part of Humboldt County, is said to have been sold about 1900 for $77.50 an acre, or approximately $2,325,000. In 1907 it sold for $4,000,000. At that time the sellers considered that they were getting $2 a thousand for the redwood. The buyer's cruise, however, showed that there was at least 3,500,000,000 feet of redwood on the tract, and the true quantity is undoubtedly much greater. The price made in 1907 did not amount to $1 a thousand for the true quantity of redwood; and there is some fir besides, of which no account has been taken. The present owners value the tract at $350 an acre, or about $10,500,000; more than two and one-half times the price of 1907, and more than four times the price of 1900.

A holder of about 18,000 acres in Humboldt County, which he estimates, roughly, at 35,000 feet per acre, valued it at $40 to $50 an acre in 1909, and said that its value 10 years earlier was about $12 or $15.

Another holder, in Mendocino County, having now a much larger acreage but a much lower average stand, bought so early as 1884 at from $7.50 to $12.50 an acre, and so late as 1905 at from $10 to $30.

Section 10. Summary view of the rise of stumpage values.

Taking the rise of stumpage values as a rate per cent per annum, it is likely to be greatest when a new region or a new species is just beginning to attract attention. When timber is selling by the acre at rates equivalent to 10 cents a thousand, it may rise almost at once to 50 cents a thousand. The increase on each thousand feet in such a case is unimportant; yet it is an advance of 400 per cent. When the price has reached $2 a thousand an advance of 400 per cent would carry it to $10.

As has been shown above (pp. 175–176), it is not possible to say definitely that the value of stumpage in general is so and so, or that it has advanced at such and such a rate. Different regions differ wholly from each other in both respects. So do different species in the same region. Moreover, even comparatively small differences of location, affecting the cost of logging, may cause wide differences of value between tracts otherwise similar. Finally, prices are affected in a surprising degree by the mere circumstances of buyer and seller. If the owner is dependent on a single buyer, the price may be very low; if he is independent, either through competition among buyers or through ability to cut his timber for himself, the price is likely to be relatively high.

Only in a very rough way, therefore, is it possible to state what the rise of stumpage values has been. The following paragraphs indicate, on the basis of the information gathered by the Bureau, the commonest rates of advance in the several regions of the investigation area during about 10 years ending with 1907 or 1908. From the depression of 1907 up to a very recent time the changes of stumpage value are believed to have been in general comparatively small.

Southern Pine Region.—The investigation of the Bureau indicates that the value of a given piece of southern pine, taken at random, is likely to have increased in any ratio from threefold to tenfold during the 10 years from 1898 to 1908. Some instances of greater increase are quoted above (pp. 195–196), and some informants named a greater increase than tenfold as normal in their vicinity. The greatest relative advance is likely to be found in timber whose value at the beginning of the period of comparison was very small. This includes both the less desirable species, like gum, which hardly had a market value till after 1900, and the less accessible tracts of pine. Some tracts which sold by the acre in the nineties, at prices equivalent to 10 or 15 cents a thousand feet, have advanced twentyfold or thirtyfold in 10 years.

Lake Region.—The general ratio of advance of timber values during the last 10 or 20 years has probably been rather less in the Lake States than in the South, because the Lake States had in the nineties a smaller proportion of timber which was not immediately available for the market. Perhaps the advance of any given tract, taken at random, in 10 years from 1898 was most likely to be between twofold and fivefold. In some localities much greater changes are reported.

Pacific-Northwest.—In the Pacific-Northwest, where much timber could be bought even in the late nineties at a few cents a thousand, there are many instances of enormous relative advance; advances which seem impossible when stated in percentages. It may be said here, as in the Southern Pine Region, that a tract taken at random is likely to have increased in any ratio from threefold to tenfold during the 10 years ending in 1907 or 1908. The proportion of advances at extraordinary rates per cent is probably greater on the Pacific slope than in the South.

While, therefore, it is impossible to express in absolute figures, or even approximately, the extent of the advance in stumpage values in recent years, the evidence presented in this chapter shows that this advance has almost invariably been marked and has frequently been enormous.

Section 11. Agitation for higher prices of standing timber.

In addition to the great increase in stumpage values which has already taken place, as shown in the preceding sections, there can be little doubt that for a large part of the timber supply, particularly in the great Pacific-Northwest, a further great increase will be realized as the amount of timber is diminished and as demand increases with increasing population. It would, of course, be wholly speculative to attempt to forecast the probable future of timber prices, even approximately. As an illustration of what is being advocated among timber owners, and some foresters as well, it is important to point out that there appears at the present time to be something approaching a propaganda to the effect that the price of stumpage should equal the cost of growing trees. When it is considered that much of the virgin timber available for market to-day has required scores, and in some cases hundreds, of years for its growth, and, furthermore, that such virgin stands are at the present time the free gift of nature, the idea of seriously advocating a price for such timber in the near future equal to the cost of raising it seems almost incredible. Nevertheless, it is advanced by responsible men, who must, from their position, be regarded as in some measure representing the lumber industry, especially as such arguments have been published and distributed by trade associations. It is therefore necessary to treat this idea seriously.

Such a price for timber was not conceived of, apparently, until a few years ago. The notion seems to have been first conceived by certain enthusiastic "conservationists," who, very likely, had no selfish interest in advocating higher prices. The idea was a new one to the timbermen, and at first it apparently surprised them. One of them, while admitting the desire of timbermen for all they could get, said that they "would not ask for so much as that." But the idea spread, and by November, 1909, a prominent lumberman had reached the point of saying in a public address delivered before the Lumbermen's Club of St. Louis:[1]

> Below the cost of production there can not be any trust that is injurious to a community or that is morally or economically wrong. * * * It is a positive sin against posterity for a lumberman to sell his lumber at less than the cost of growing the trees or less than some good competitive substitute can be provided for. Any law and any trust that will prevent a man cutting and selling timber below the cost of reproducing it and a reasonable added profit, is a good law and a good trust for the people.

This speaker actually proposed a law to keep timber owners from selling below the limit indicated, one of the provisions of which was to be as follows:

> If the timber cut and removed is being sold at less than cost of reproduction, it shall be prima facie evidence of intentional violation of this act, and the difference between the price obtained and the cost of reproduction, to be estimated and ascertained according to the best available methods, shall be the measure of damage to be assessed and collected, as all fines and penalties are adjudged and collected for other misdemeanors.

It is difficult to believe that timbermen generally would support any such extraordinary suggestion as this for an actual law of this character, and it is not here presented as fairly reflecting the drift of sentiment among lumbermen but as a matter of sufficient interest to warrant mention.

Again, Mr. R. S. Kellogg, secretary of the Northern Hemlock and Hardwood Manufacturers' Association, said in 1910:

> For the benefit of my good friends among the lumbermen of the United States, I should like to paint a rosy new year of strong demand and satisfactory prices for that product—a year in which yellow pine, Douglas fir, and hemlock would cease to compete, and each be marketed on the basis of its own intrinsic value; * * * a year in which forest conservation would become a reality, because timber brought a price at which it could be grown.[2]

The idea of a price for stumpage equal to the cost of production apparently rests on the proposition that the natural supply of virgin timber is diminishing, and that when it is gone there will be no sufficient new supply unless measures are taken to raise timber; but that such measures are not likely to be taken unless the price of timber is immediately made high enough to cover the cost of raising it.

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[1] J. B. White, address before the Lumbermen's Club of St. Louis, Nov. 9, 1909.

[2] "Some Christmas Reflections," by R. S. Kellogg, in The Southern Lumberman, Dec. 24, 1910, p. 73.

One simple answer is this: The planting of trees to-day for sale fifty or seventy-five years hence is not determined by the price of timber to-day, but by what men think the price likely to be when the time comes to cut. To induce men to plant, it is not necessary to pay to the owners of the present natural supply what it would have cost to grow that supply by human labor. It is only necessary that men believe that by the time trees now planted mature the natural supply will be so far exhausted that there will then be a demand for the planted timber at rather more than the cost of raising it.

A more complete answer should, however, be given; and for this purpose, since the high price of timber is advocated as a conservation measure, it should first be considered what public end the conservation or cultivation of timber ought to serve. The end is often formulated in such terms as these: To prevent the exhaustion of our timber supply. This is not quite accurate. A literal and complete exhaustion of the timber supply is impossible. There will always be some timber, and it will always be possible to buy lumber. The thing to fear is not total absence of lumber, but high prices for it. The rational purpose of measures of planting or preservation, from a public point of view, is to keep the price from rising unnecessarily high.

But the proposal now brought forward in the name of conservation is a proposal deliberately to hasten the evil which conservation ought to moderate—the evil of excessive prices.

If, in connection with the marked and increasing concentration of timber ownership set forth in this report, the idea is to be inculcated by and among timbermen that prices should as rapidly as possible be carried to the cost of reproduction, it is obvious that this is a matter of grave concern to the consumer of lumber. Even without any effort to inculcate such a theory of timber prices, it is apparent, as already stated, that a further great advance in stumpage values is to be expected. Owing to the fact that not only the largest holders, but even the smaller holders, are aware that they possess a natural resource which is diminishing in quantity, there is a strong tendency for the owner of timber to await higher prices. If this natural tendency toward higher prices is to be accelerated by the spread of such a propaganda as that above described, and further fortified by increasing concentration of ownership, it is obvious that unreasonable prices for timber are exceedingly probable.

The situation clearly calls for serious consideration by those responsible for legislation or administration affecting this important natural resource. It would appear that the Government is in a position to modify very substantially what might otherwise be the logical result of present conditions of timber ownership. In this connection, the proper policy to be adopted in respect to the cutting of the Government's present stand of timber (about one-fifth of the country's total supply) becomes a matter for careful consideration; and much may be accomplished in this direction. In the matter of timber culture, the Government's advantage is greatly increased because of its ability to borrow capital on more advantageous terms than even the most favorably situated private owner, while its ownership of large areas of land adaptable to timber culture, and which may be regarded as involving practically no investment, gives it further and marked advantages.

CHAPTER VI.

PUBLIC-LAND POLICY A PRIMARY CAUSE OF CONCENTRATION OF TIMBER OWNERSHIP.

Section 1. Introductory.

The marked concentration of ownership of timber in this country discussed in preceding chapters has resulted primarily from the public-land policy of the Federal Government. That policy has either directly facilitated, or failed to prevent, the tendency of this limited natural resource to become more and more concentrated in ownership as its future value was understood. It is not intended here to trace the development of the land policy fully nor in its historical sequence. But it is important to set forth its principal features in their bearing on the concentration of timber ownership. This is necessary to an understanding of how the significant conditions revealed in foregoing chapters have come about. More important still, a clear insight into the results of the land policy thus far pursued is necessary to a wise settlement of questions of the first magnitude now before the country, involving its natural resources.

The land legislation which has been especially responsible for the present concentration of timber ownership may be divided into two classes: (1) Land grants: Special grants for railroads, wagon roads, canals, and river improvements; and general grants to States for educational purposes, drainage, internal improvements, etc. (2) General land laws: The cash-sale law, the scrip and warrant acts, the preemption and homestead laws, and the timber and stone law. These grants and general laws, loosely drawn and loosely administered, were direct causes of the concentration of timber ownership now existing. In considering them to-day, account should be taken of the different conditions or peculiar exigencies existing at the time of their enactment. But a study of the practical result of these statutes is of importance in administration and in new constructive legislation affecting the public domain.

LAND GRANTS.

Section 2. Extent of land grants for railroads, wagon roads, canals, and river improvements.

By far the most important feature of the land policy in its effect on concentration of timber ownership was the Federal legislation making grants for railroads and other means of transportation. The three largest timber holdings in the country, as will be fully shown below, are wholly or largely based on railroad grants.

The total amount of public lands granted by the Government for railroads, according to a recent estimate of the General Land Office, was 190,000,000 acres, or more than one-eighth the area of the "public-land States"; i. e., the States in which the public lands were at the disposal of Congress.[1] Of this, some 35,000,000 acres were subsequently forfeited because of failure to construct the railroads, leaving, however, no less than 155,000,000 acres as the estimated area of the unforfeited grants.

Up to June 30, 1910, the immense total of 113,660,000 acres had been actually patented to railroads under their grants. This is practically the equivalent of the entire land area of Pennsylvania, Ohio, Indiana, and Illinois. In addition, many million acres will be available for patent under some of the grants that are still in the process of adjustment, notably the Northern Pacific, Southern Pacific, and Santa Fe; but the exact amount can not be determined in advance.

The figures above cover only the Federal land grants. They do not include grants made by the State of Texas, which controlled its own public lands, and which has patented to railroads 32,400,000 acres.[2] Thus, for the whole country, the total of land subsidies actually received by railroads up to 1910 from the Federal Government and from Texas is 146,060,000 acres; and the estimated area of Federal railroad grants pending adjustment is 41,340,000 acres, the greater part of which will probably ultimately be secured by the railroads. Besides, the Federal Government has patented approximately 8,990,000 acres for wagon-road, canal, and river-improvement companies—2,987,000 for wagon roads, 4,598,000 for canals, and 1,405,000 for river improvements.

These enormous totals do not include large railroad, wagon-road, and canal grants made by individual States out of land which they had received from the Government, not only under the internal-improvement act, but also under the swamp-land act. Some account of these grants is given on pages 253–254.

USUAL FORM OF RAILROAD GRANTS.—In most of the Federal railroad grants Congress gave, within a "primary limit" extending a certain number of miles on either side of the road when it should be definitely located, alternate sections (640-acre tracts) of such lands as had not already been disposed of, reserved, or otherwise appropriated or excluded from the grant. Furthermore, in order to indemnify it for "loss," within such "primary limits," of lands disposed of, or reserved, or mineral lands excepted from the grant, the railroad was usually allowed by Congress to select an equal acreage in the alternate sections of an "indemnity strip"—commonly 5 or 10 miles in width—on each side of the primary limits, provided such equal amount of available acreage could there be found. In the case of certain canal grants an absolute number of acres was conferred, but this was not true of railroad grants. In practically all railroad grants the possible maximum that could be secured was the amount in *alternate* sections within the *primary* limits. In many cases it has proved that the acreage not available within the primary limits (commonly spoken of as "lost") was greater than the grantee could find available in the indemnity strips under the terms of the grant, owing to the fact that much land had been taken up by settlers or other owners, or reserved. But it should be clearly understood that there is really no such thing as loss by the railroad, since the acreage actually granted was only that part of the possible maximum which could be found available within the fixed limits and terms. That is, just as soon as a railroad has received its patent to the last piece of land available to it within the limits and restrictions set, it has received the total amount of its actual grant, even though that total may fall far short of the possible maximum had all the alternate sections within the primary limits been available for railroad selection. It can not be said that any lands are still due such a railroad.

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[1] The public-land States are Wisconsin, Michigan, Illinois, Indiana, Ohio, Mississippi, Alabama, Florida, and all the States west of the Mississippi River except Texas. The area of these States is 1,442,200,320 acres. Alaska, though a public-land Territory, is excluded from the calculation given above.

[2] This does not include 1,431,000 acres recovered by the State for failure of the railroads to comply with the conditions imposed. An interesting feature of the Texas law is the requirement that the railroads alienate half of the granted lands within six years and all of them within twelve years of the date of patent. Among the more important railroads to which Texas granted lands were those now forming the Southern Pacific; the Texas and Pacific; Gulf, Colorado and Santa Fe; Houston and Texas Central; Missouri, Kansas and Texas; International and Great Northern; and St. Louis Southwestern.

It may be added that lands retained by the Government within the primary limits, i. e., the sections intervening between the railroad lands, were not subject to sale for less than $2.50 per acre, which was double the minimum price of Government lands outside those limits.[1] The purpose of this was that the Government, after giving the railroad half the sections, should get as much for the remaining half as it would otherwise have got for the whole. By the act of June 15, 1880 (21 Stat., 237), the price of such of these lands as had been on the market since 1861 was reduced to $1.25 per acre.

Map of Federal grants for railroads and wagon roads.—Opposite page 222 is a map showing the limits within which land grants were made by the Federal Government to aid in the construction of railroads and wagon roads. The purpose of this map is to illustrate forcibly how far Congress went in its policy of land subsidies for the construction of means of transportation. It must be remembered that these are only the Federal grants. The Texas grants of 32,400,000 acres are not included, nor the numerous but less important grants made by the States themselves.

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[1] Such increase of price of remaining Government lands in primary limits was made by many of the granting acts themselves. Preemption entries in limits of all grants were raised to $2.50 by act of Mar. 3, 1853 (10 Stat., 244); and by practice of Interior Department, crystallized into law by Rev. Stat., sec. 2357 (see annotated edition), private-sale entries were also raised to this price.

In this connection the caution is repeated against assuming that the entire area within the limits shown on the map was granted to the railroads. The first set of heavy lines on each side of a road indicates the "primary limits" of the grant — a term already explained — within which limits it was to receive each alternate section (or part thereof) not already disposed of or reserved. The possible maximum of a grant, therefore, was half of the land within the primary limits. The second set of heavy lines, seen farther out on each side of the road in many grants, indicates the "indemnity limits" referred to above within which the railroad could select vacant alternate sections (or parts thereof) to make up for lands within the primary limits that had been previously disposed of or reserved. Often so much land had been disposed of or reserved both in the primary and the indemnity limits that a road received considerably less than its possible maximum. In Iowa so much land had already been disposed of at private sale, under warrants and to settlers, that although the State appears practically covered by grants only a little more than one-eighth its area was received by the railroads. But in regions where there was less of prior purchase and settlement the railroads secured a higher proportion; in some cases the whole of the possible maximum.

The third set of heavy lines in the Northern Pacific grant represents the "second indemnity" limits, established, for the most part in comparatively recent years, in those States where it has been determined that the maximum is not available within the primary and first indemnity limits.[1] In some of the eastern grants the extra sets of lines are due to the fact that the original primary limits, or both primary and indemnity limits, were subsequently extended.

As a guide to the eye in judging the distance between the outer limits of the various grants, it may be stated that in the case of the Union Pacific and Central Pacific grants from Nebraska to California the distance from outer limit to outer limit is 40 miles, 20 miles on each side of the road; and that in the case of the partly forfeited Atlantic and Pacific grant in northern New Mexico and Arizona the distance is 100 miles, 50 miles on each side of the road.

This map is reproduced here, with some revision, from The Public Domain, in which it was published as of June 30, 1883.[2] The title

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[1] This in accordance with the resolution of May 31, 1870 (16 Stat., 378), which provided for the future establishment of these additional indemnity limits under certain circumstances.

[2] The note by the Bureau in the lower left-hand corner of the map states it was published in 1883 in The Public Domain (H. R. Misc. Doc. No. 45, Pt. 4, 47th Cong., 2d sess.). It should be added that it had previously been published in 1878 in an historical article by Willis Drummond on the Federal land grants, in connection with Maj. J. W. Powell's report on the Arid Lands of the United States (H. Ex. Doc. No. 73, 45th Cong., 2d sess.).

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and legend have been made more exact; and a table showing the latest estimate of the General Land Office of the total area of the grants (forfeited and unforfeited), and also the amount patented to June 30, 1910, has been substituted for the tabular statement on the old map. The former map did not show all the grants, nor does the present one. Two early wagon-road grants in Ohio and Indiana were omitted, because their location was not available. Several relatively unimportant railroad grants in the South and in California, some of which were forfeited prior to 1883 and some subsequently, were also omitted, no map of definite location or general route having been filed in the General Land Office. For the same reasons, the grants referred to are omitted in the revision.[1]

The most important change in the new map is the indication by a separate symbol of those grants that were shown as valid on the former map, but which have since been forfeited. Where a forfeited grant overlaps one unforfeited (as the forfeited Atlantic and Pacific in upper southeastern California overlaps the Southern Pacific), the forfeiture symbol is not placed on the overlapping part. Practically all the forfeitures were on account of failure to construct the line. The more important of those indicated on the map were forfeited by special acts from 1884 to 1889, and the remainder by a blanket forfeiture act of September 29, 1890 (26 Stat., 496), which, with certain exceptions, forfeited grants opposite all railroads or portions of railroads not then constructed. The chief examples of forfeiture are the Texas Pacific grant in southern New Mexico, Arizona, and California; and part of the Atlantic and Pacific in northeastern New Mexico and in California.

As to that part of the Atlantic and Pacific grant extending from the point where it reached the ocean at Ventura, near Santa Barbara, Cal., northward, hugging the coast to San Francisco—a stretch of about 400 miles—it should be stated that the company's claim to a grant for this 400 miles was approved by the Interior Department in 1872 and recognized as valid till 1886. But in the early part of that year Secretary Lamar, reviewing the decision of his predecessor, held that the company had no grant north of Ventura because, according to the granting act, the road was to extend "to the Pacific Ocean." In the same year Congress forfeited the Atlantic and Pacific grant opposite any part of the road not constructed. The company had not constructed its road in eastern New Mexico and had built none at all in California. Hence, as a practical matter, the act of Congress disposed of any further question as to whether the company did or did not originally have a grant north of Ventura. The 1883 map showed the grant as continuing northward to San Francisco, and on the present map it has been simply marked as forfeited.

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[1] The former map omitted also a 50-mile stretch in the grants extending from Portland, Oreg., to Sacramento, Cal.—the part on either side of the boundary between the two States. At that time the roads had not been definitely located through this 50-mile stretch of mountainous country, and, indeed, it was then thought they would never be constructed. The lines have since been built through, however, and the lands received; hence, the map has been revised to agree. The Ontonagon and Brule River grant in the extreme western part of the Upper Peninsula of Michigan was omitted from the former map, but 20 miles of the road was subsequently built, from Ontonagon on Lake Superior southward. On the present revision this grant has, therefore, been added—not only the 20 miles obtained by construction but the remaining forfeited part of the grant southward to the Wisconsin-Michigan boundary.

The only other change of consequence in the revision was in the Northern Pacific grant. At the date of the former map the line of the Northern Pacific from the Columbia River over the Cascade Mountains to Tacoma had not been located and only the general route could be shown for that part of the road. Since then the road has been constructed, and the present map shows the revised limits of the grant based on the line as actually constructed, which differs considerably from the proposed general route. The second indemnity limits of the Northern Pacific referred to above were shown on the former map only in Minnesota. In Montana, Idaho, western Washington, and northwestern Oregon they have only recently been established.

The grant for the Grand Rapids and Indiana Railroad, as shown on the map, extended from Fort Wayne, Ind., to the northern end of the Lower Peninsula of Michigan; but all the lands secured by the company lay in Michigan, none being available in Indiana. In Iowa, the State was released from the construction of that part of the original Iowa Central Air Line Railroad east of Cedar Rapids. (Act of June 2, 1864, 13 Stat., 95, interpreted in 110 U. S., 27, 33.) Sufficient lands not being available to satisfy the grant for the portion actually constructed west of Cedar Rapids, the grantee was allowed to select lands within the indemnity limits opposite the unconstructed part east of that city. In Alabama, part of the Mobile and Girard grant, running easterly from Mobile to the Georgia boundary, was forfeited, but indemnity selections were allowed within the indemnity limits opposite the forfeited portion.

The railroad lines shown on the old map in many cases represented merely the proposed location of lines then unbuilt. However, it did not seem worth while to make any revision of the lines themselves (as distinguished from the grant limits), except in the western part of the Northern Pacific. In general, no special effort has been made by the Bureau to obtain minute accuracy in revising the former edition; it was not essential to the purpose in view, nor could it well be achieved in a map so small in scale.

IMPORTANT TIMBER REGIONS TRAVERSED BY GRANTS.—Many of the railroad and wagon-road grants traversed important timbered regions. The Northern Pacific traversed the timber belt of western Montana, northern Idaho, and northeastern Washington, and also the great Pacific coast fir belt in western Washington. The grants now controlled by the Southern Pacific swept through the Pacific coast fir and pine belts from Portland southward to Sacramento. The Atlantic and Pacific grant in northern Arizona and New Mexico included considerable areas of western pine; and the Union Pacific had smaller timbered areas in Wyoming, Colorado, and Utah. The grants in Michigan from about the forty-third parallel northward were in the white-pine belt. So also were the grants in Wisconsin, except part of that running from Madison northwestward toward St. Paul; and those in the northern and northeastern part of Minnesota, covering perhaps a third of the granted area in that State. In the southern yellow-pine belt were all the grants in Louisiana, Mississippi, and Florida, and most of those in Arkansas and Alabama. A few of the grants were in hardwood regions.

Part of these railroad grants, on the other hand, of course, were in nontimbered regions. Thus, the Union Pacific grant in the main traversed prairie or semiarid regions; and that portion of the Central Pacific grant which lies in Utah and Nevada had little timber. Again, those parts of the Northern Pacific grant lying in North Dakota, eastern Montana, and central Washington, and the Southern Pacific grants in California south of San Francisco, were in nontimbered regions. Much of the land included in the grants in Illinois, Iowa, and southern Minnesota was prairie.

Partial investigation indicates, as shown in a later section, that a very high proportion of the granted timberlands have passed into the hands of powerful timber companies.

Section 3. History of Federal land grants for railroads, wagon roads, canals, and river improvements.[1]

The era of Federal land grants for railroads was practically from 1850 to 1871. By the latter date the unwisdom of these great land subsidies was realized and the policy was abandoned.

The grants for railroads were far more important than those for other means of transportation, but they were not first in time. In 1824 Congress had begun the policy of making grants of land to develop systems of transportation by making a canal grant to the State of Indiana; but the grant was not made use of. In 1827 canal grants made to the States of Indiana and Illinois were accepted and used. Up to 1866 grants were made to Ohio, Wisconsin, and Michigan for eight other canal-construction projects. In these projects the State in turn granted the land to private companies.

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[1] For history and statistics of these grants up to 1883, see The Public Domain, 1884. For statistics, see also Annual Reports of Commissioner of General Land Office; Report of Public Lands Commission, Washington, 1905 (S. Doc. No. 189, 58th Cong., 3d sess.); and Statement Showing Land Grants Made by Congress, issued by General Land Office, 1907.

There were three river-improvement grants made by Congress; the first in 1828, in northern Alabama; the second in 1846, along the Fox River, in eastern Wisconsin; the third in 1846, along the Des Moines River, in Iowa.

For wagon roads, Congress in 1802 made grants of money to Ohio, but afterwards the policy of grants of land to States for wagon roads was adopted. From 1863 to 1869 grants were made to Wisconsin, Michigan, and Oregon for military wagon roads. There were eight of the military wagon-road grants, and these were transferred by the States to private companies.

RAILROAD GRANTS THROUGH THE AGENCY OF THE STATES.—Railroad land grants may be said to have begun in 1850 with an act granting lands to the States of Illinois, Alabama, and Mississippi to aid in construction of railroads between specified points. From 1850 to 1862 the railroad grants were made to the States, which in turn granted them to private corporations. Illinois transferred its grant to the Illinois Central Railroad, but with a provision that from 5 to 7 per cent of the annual gross receipts of the original lines of the company should be paid to the State. In 1870 this provision was safeguarded by an amendment to the State constitution forbidding that the rights of the State under this contract be ever released, suspended, modified, or impaired. The road was to be a public highway, to be used by the Government free of toll or other charges, and the mails were to be carried at prices to be fixed by Congress. The States of Alabama and Mississippi transferred their grants to the Mobile and Ohio Railroad, which was to connect with the Illinois Central and branches.

Grants similar, in general, to those for Illinois, Alabama, and Mississippi were made to other States—to Missouri in 1852, to Arkansas in 1853, to Iowa, Wisconsin, and other States in 1856, to Minnesota in 1857, etc.—several grants often being made to the same State.

RAILROAD GRANTS DIRECT TO CORPORATIONS.—The making of Federal grants direct to corporations to aid the construction of these internal improvements was at first opposed as an unconstitutional invasion of State rights, and it was for that reason that the early grants were made to the States, which in turn granted them to corporations designated by the State legislatures. But for a railroad through the almost unsettled region from the Missouri River to the Pacific it seemed desirable that the Federal Government should make a direct grant. The agitation for a Government-aided railroad to the Pacific was strong as early as 1842. Asa Whitney asked Congress to grant him 100,000,000 acres to build such a road, and the plan was vigorously urged. Stephen A. Douglas, in 1845, proposed a railroad from Lake Erie to the Pacific coast, urging the organization of Territories which should take and transfer the grants. Other proposals were made, including a plan for aiding the road by the loan of Government 5 per cent bonds to the extent of $12,500 per mile; and the War Department made a series of surveys and explorations to find the most practicable railroad route.[1]

In 1856, and again in 1860, some kind of land subsidy for a transcontinental road was indorsed by both the Republican and the Democratic parties in their platforms. President Lincoln in his messages to Congress made recommendations and suggestions on the subject.

Finally, on July 1, 1862, the Union Pacific Railroad Company was incorporated by direct act of Congress. This company and other corporations named in the act were to build a railroad from the Missouri River to the Pacific. The main line ran from Omaha westward to San Francisco; but one branch ran from Kansas City through central Kansas to Denver, joining the main line at Cheyenne, Wyo.; another ran from Atchison, Kans., 100 miles westward; and another from Sioux City to a junction with the main line at Fremont, Nebr. The main line as far west as Ogden was built by the Union Pacific, and from there to San Francisco by the Central Pacific and Western Pacific, both of which roads are now owned by the Southern Pacific. The branch from Kansas City to Cheyenne (that part from Kansas City to Denver at one time known as the Kansas Pacific, and that from Denver to Cheyenne as the Denver Pacific) was subsequently acquired by the Union Pacific, as was the line from Atchison westward. The branch from Sioux City was projected by the Union Pacific, but was subsequently acquired by the Sioux City Pacific and is now part of the Chicago and Northwestern line.

Following the Union Pacific grant in 1862 other Federal land grants were made direct to corporations. The more important were as follows: (1) The Northern Pacific, from Lake Superior to Puget Sound. (2) Certain grants now controlled by the Southern Pacific, viz, the two Oregon and California Railroad grants in Oregon, from Portland westward and from Portland southward to the State boundary; the California and Oregon from the junction with the preceding road at the State line southward to Sacramento; the Southern Pacific itself from San Francisco southeastward to the Colorado River at Needles, Cal.,[2] with a branch from Mohave via Los Angeles to the Colorado River at Yuma, Ariz. (3) The Atlantic and Pacific, from Springfield, Mo., via Albuquerque, N.

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[1] Five transcontinental routes were covered in these surveys. They are, in general, the routes followed by the present Northern Pacific, Union Pacific, Denver and Rio Grande, Santa Fe, and Southern Pacific railroads.

[2] That part of this line between Needles and Mohave, Cal., has been recently leased to the Atchison, Topeka and Santa Fe. The control of the grant, however, remains with the Southern Pacific.

Mex., and Needles, to the Pacific Ocean near Santa Barbara;[1] subsequently forfeited except through Missouri, western New Mexico, and Arizona. The unforfeited part of this grant is now owned by the Atchison, Topeka and Santa Fe. (4) The Texas Pacific, from Marshall, Tex., across Texas to El Paso, and thence via Yuma to the Pacific Ocean at San Diego. Texas gave a grant for the part of the road constructed through its domain, but the Federal grant for the part through New Mexico, Arizona, and California was forfeited. The Southern Pacific subsequently built the road from Yuma to El Paso, but did not succeed in having the grant transferred to it. There were other less important grants direct to corporations, and during the whole period grants were also made through the agency of the States as had been done before 1862. The last of the grants was made in 1871.

"FOREST-LIEU" LEGISLATION.—Closely associated with the railroad-grant legislation was the later "forest-lieu" legislation, the effect of which, in the case of certain western railroads, has been to increase, not the extent of the grants, but their value.

The first forest-lieu legislation was passed in a sundry civil appropriation act of June 4, 1897 (30 Stat., 36), which allowed a settler or owner whose lands fell within the exterior boundaries of a forest reserve to exchange such lands, if he so desired, for an equal area to be selected from unoccupied, unreserved, and nonmineral lands anywhere in the public domain. By act of June 6, 1900 (31 Stat., 614), and act of March 3, 1901 (31 Stat., 1037), selections under the previous act were restricted to surveyed lands. The word "owner" in the statute was sufficient to include the land-grant railroads, and the practical effect of the act, so far as such railroads were in a position to take advantage of it, was to enhance the value of their grants without affecting the absolute area. For, since the national forests were created in part to cover mountain watersheds, as well as timber areas still left to the Government, it followed that within the limits of some of these forests there were tracts of bare and worthless mountain lands, as well as good timber lands. It was therefore possible for a railroad, any of whose lands fell within the boundaries of the national forests, to retain such as were valuable, and at the same time to relinquish to the Government such as were worthless or of low value, and select in lieu an equal area of well-timbered land outside of the national forest boundaries.

The Northern Pacific was the only land-grant railroad in the investigation area conspicuously affected by this legislation. Relinquishments of land within the national forests were made by this railroad on a very extensive scale. The Southern Pacific Company made few, if any, relinquishments or lieu selections. Relinquishments and selections were made by many individual settlers and owners.

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[1] See p. 223 regarding the company's former claim for the extension of its grant from Ventura, Cal., near Santa Barbara, 400 miles northward along the coast to San Francisco.

In Arizona, outside the investigation area (defined on p. 62), extensive relinquishments were made by the Santa Fe Pacific Railroad Company (controlled by the Atchison, Topeka and Santa Fe), successor to the old Atlantic and Pacific Railroad Company's grant; and by certain companies and individuals who had purchased lands from the Atlantic and Pacific. The lieu selections taken in place of these relinquishments will be referred to on a later page (p. 242). Some of the selections under this Atlantic and Pacific grant, by agreement with the Secretary of the Interior, were restricted to nontimbered lands.

The first lieu selections of the Northern Pacific in Montana, Idaho, Washington, and Oregon were made by the company itself. In Washington and Oregon many of these early lieu selections were shortly afterwards sold or contracted to the Weyerhaeuser Timber Company. (See p. 237.) The later practice of the Northern Pacific and of certain other large owners of lieu-selection rights has been to sell these rights in the form of "scrip" at so many dollars per acre. The land to which this scrip applies is actually selected by the purchaser, but the seller of the scrip files the lists of relinquishments and lieu selections in the Land Office, and contracts to transfer title to the purchaser as soon as patent issues from the Government, the law providing that the Land Office should issue patent in the name of the party making the original relinquishment.

The lieu-selection acts above referred to (those of June 4, 1897, June 6, 1900, and Mar. 3, 1901), were repealed on March 3, 1905 (33 Stat., 1264), though provision was made for the perfecting of pending lieu selections made prior to the passage of the repeal. The act also provided that the validity of contracts previously entered into by the Secretary of the Interior should not be impaired.[1]

There were other acts in 1898 and 1899 under which the Northern Pacific was allowed special lieu-selection rights. These will be noticed later (p. 237).

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[1] A Land Office circular of May 16, 1905, framing regulations under this act of March 3, 1905, states that under the provision as to contracts entered into by the Secretary of the Interior, selections are still authorized to be made in satisfaction of tracts relinquished or to be relinquished, as follows: First, lands in the San Francisco Mountains Forest Reserve, Ariz., relinquished or to be relinquished by the Santa Fe Pacific Railroad Company, the Aztec Land and Cattle Company, the Saginaw and Manistee Lumber Company, William F. Baker, or Edward B. Perrin; second, lands in the Grand Canyon Forest Reserve, Ariz., relinquished or to be relinquished by the Santa Fe Pacific Railroad Company; and, third, lands in a certain part of the Santa Barbara Forest Reserve, Cal., relinquished or to be relinquished by the Santa Barbara Water Company, or Jed. L. Washburn.

Senate Document No. 612, Sixty-first Congress, second session, in response to a Senate resolution requesting the Secretary of the Interior to furnish information relative to the above contracts, gives information connected therewith and also lists in detail all the lieu lands selected both prior to and since the repeal of March 3, 1905, showing the restricted and unrestricted selections made in lieu of the relinquished tracts.

Enough has been said to make clear the general results of "forest-lieu" legislation. The purpose apparently was to enable the Government to regain as much land as possible for reservation in compact blocks, and to enable settlers within forest-reserve limits, if they so desired, to relocate elsewhere in regions where the settling up of the country had not been arrested by large withdrawals. By the actual working of the law, however, the Government reacquired a great deal of worthless or comparatively worthless land, much of it from railroad grants, and gave in exchange an equal area of excellent timberland.

Section 4. Land grants controlled by the Southern Pacific Company and the Union Pacific Railroad Company and amounts of land still held.

Certain of the railroad grants which have had the greatest effect in concentrating timber ownership will now be discussed, the first being those now controlled by the Southern Pacific and the Union Pacific. Practically all the present holdings of the Southern Pacific Company, the largest timber holder in the United States, were derived from land grants. The most important of these grants, so far as timber is concerned, were in Oregon and northern California. The present section will show the total amount of land patented by the Government up to June 30, 1910, to the railroads now forming the Southern Pacific system, and that patented to the railroads now forming the Union Pacific Railroad, which controls the Southern Pacific.[1] It will also show the total acreage still owned or claimed by the Southern Pacific and the Union Pacific on June 30, 1910, under these grants.

THE SOUTHERN PACIFIC'S LAND GRANTS IN OREGON.—In Oregon the Southern Pacific's lands, with the exception of some 5,000 acres, are in the name of the Oregon and California Railroad Company, a subsidiary corporation. The latter company holds, or is successor to, two grants in Oregon. These were made by Congress under acts of 1866, 1868, 1869, and 1870. The total amount of land patented under the two grants to June 30, 1910, was 2,892,585 acres, of which 2,074,454 acres remained unsold. The great bulk of the land was heavily timbered.

The Government is at present engaged in a suit in equity, which seeks, among other remedies, to regain title to this 2,074,454 acres, and also to the still unpatented part of the grants, which in the bill of complaint is estimated to amount to about 293,000 acres. The grounds of the suit and its present status are summarized on page 250.

THE SOUTHERN PACIFIC'S LAND GRANTS IN CALIFORNIA.—In California the Southern Pacific Company controls five grants, none of which is involved in the suit just mentioned. One of them, however (the Central Pacific), was made on the condition, also imposed in the case of the Union Pacific, that all lands not sold or disposed of three years after the completion of the railroad should be subject to settlement and preemption like other lands at a price not exceeding $1.25 per acre, to be paid to the company. In construing this condition in the Union Pacific grant, the Supreme Court, in 1878, held that a mortgage of the entire grant constituted a "disposal" within the meaning of the act,[1] thereby rendering the condition practically ineffective. In two of the grants (Southern Pacific main line and California and Oregon) the condition that the roads should be completed by a certain date was not fulfilled. These grants have not been attacked by the Government for noncompliance with the conditions.

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[1] See footnote, p. 17.

The total acreage patented in California up to June 30, 1910, under the grants now held by the Southern Pacific Company, was 9,285,802 acres; much of it, however, in nontimbered parts of the State.

In Oregon and California, taken together, there had been patented up to June 30, 1910, under these grants, 12,180,097 acres.

The Southern Pacific's land grants in other States.—In addition to these lands in Oregon and California, the Federal Government up to June 30, 1910, had patented to the Central Pacific (now controlled by the Southern Pacific) the following amounts of land in other States: In Idaho, 9,546 acres; in Nevada, 3,584,722 acres; in Utah, 1,284,542 acres; a total of 4,878,810 acres. All this land except that in Idaho is outside the Bureau's investigation area and carries little timber.

Texas not being part of the public domain, the Federal Government had no land to grant in that State. The State of Texas itself granted many millions of acres[2] to railroads afterwards absorbed by the Southern Pacific Company. A Texas law, as noted above, requires that all lands patented by the State to a railroad shall be disposed of by the grantee, one-half in six years and the remaining one-half in twelve years from the issuance of the patents. According to the terms of this law much of the patented land should have been disposed of before the Southern Pacific took over the roads which received the grants. The Bureau has made no investigation of the exact amount patented to these roads, nor of the amount held by them when the Southern Pacific came into control, or secured by them since that time. Much of the land is in the nontimbered part of the State.

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[1] Platt v. Union Pacific (99 U. S., 48, 64).

[2] See the Reports of the Texas Land Commissioner, 1871 to 1908; also Abstract of Titled and Patented Lands (1867 to 1871).

SUMMARY OF LANDS PATENTED BY THE FEDERAL GOVERNMENT UNDER THE SOUTHERN PACIFIC GRANTS.—The amount patented by the Federal Government to the roads now belonging to the Southern Pacific may be summed up as follows, by States and by grants:

TABLE 53.—ACREAGE PATENTED, UP TO JUNE 30, 1910, BY FEDERAL GOVERNMENT UNDER LAND GRANTS NOW CONTROLLED BY SOUTHERN PACIFIC COMPANY.

[Compiled from Report of Commissioner of General Land Office for 1910.]

	Acres.
Oregon:	
Oregon and California Railroad Co. ("East Side" grant)	2,765,677.10
Oregon Central Railroad Co. ("West Side" grant), Oregon and California Railroad Co., successor	128,618.13
Total	2,894,295.23
California:	
Central Pacific Railway Co.	878,896.82
Central Pacific Railway Co. (successor to Western Pacific Railroad Co.)	458,147.97
Central Pacific Railway Co. (successor to California and Oregon Railroad Co.)	3,154,913.49
Southern Pacific Railroad Co. (main line)	3,478,136.44
Southern Pacific Railroad Co. (branch line)	1,315,707.13
Total	9,285,801.85
Idaho:	
Central Pacific Railway Co.	9,545.59
Nevada:	
Central Pacific Railway Co.	3,584,722.58
Utah:	
Central Pacific Railway Co.	1,284,541.90
Grand total	17,058,907.15

UNION PACIFIC LAND GRANTS.—In addition to this aggregate of 17,058,907 acres patented by the Federal Government to roads controlled by the Southern Pacific, the Government has patented to the Union Pacific (which now controls the Southern Pacific), and to railroads to which the Union Pacific is successor, the enormous total of 19,136,992 acres[1] in various States. This makes a grand total of 36,195,899 acres transferred by Federal grant from the public domain to the railroads controlled by the Union Pacific and the Southern Pacific, which now form a single system.[2] This is the equivalent of the entire area of Iowa or that of Wisconsin.

All of the 19,136,992 acres patented to the Union Pacific and practically all of the 4,878,810 acres patented to the Central Pacific in Idaho, Nevada, and Utah are outside the Bureau's investigation area. Moreover, by far the greater part of the old Western Pacific grant and of the Southern Pacific main-line and branch-line grants in central and southern California is in nontimbered regions.

TOTAL ACREAGE AT PRESENT OWNED OR CLAIMED BY THE SOUTHERN PACIFIC.—By no means all of the immense area just referred to as patented to the railroads of the great Southern Pacific Company is still owned by them. Part has been sold, and not all the granted lands have yet been patented. The company includes in its present acreage the patented lands unsold, and also the unpatented granted lands claimed by it. It may be that not all the unpatented lands are still claimed by the company, since it is possible for it to contract to sell before actually receiving patent from the Government. The figures here given for the present acreage of the Southern Pacific owned or claimed on June 30, 1910, are taken from the company's annual report to stockholders. Certain other lands of the company acquired in other ways than through the land grants are not included in this total. The term "granted lands" as used in this connection, of course, includes indemnity lands taken under the grants, as well as lands within the primary limits. The company's report shows 13,879,932 acres unsold, and is as follows, by grants:

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[1] Compiled from Report of Commissioner of General Land Office for 1910.

[2] See footnote, p. 17.

TABLE 54.—GRANTED LANDS OF SOUTHERN PACIFIC COMPANY SUBJECT TO MORTGAGE AND REMAINING UNSOLD JUNE 30, 1910, WITH ACRES SOLD DURING PRECEDING YEAR.[1]

Acres pledged for account of the following bonds.	Acres sold during fiscal year 1910.	Acres remaining unsold June 30, 1910.
Central Pacific Railway Co. 3½ per cent mortgage bonds	58,802	7,486,478
Oregon and California Railroad Co. first mortgage 5 per cent bonds	80	[2] 2,342,250
Southern Pacific Railroad Co. (of California) 6 per cent bonds of 1875	54,716	4,049,568
Trustees Houston and Texas Central Railway Co. lands	264,232	1,636
Total acres sold and total remaining unsold	377,830	13,879,932

[1] At the time of the publication of the Summary of this Report on February 13, 1911, the latest information available was that showing the acreage on June 30, 1909. The total unsold was then given as 14,408,217 acres. During the fiscal year 1908-9 the company sold 77,101 acres in Texas, and in 1909-10 sold 264,232 acres in Texas. In this connection, see the reference to the Texas law on p. 220.

[2] Company owns in addition 15,544 acres of granted lands not mortgaged.

Probably half, or more, of the 7,486,478 acres of the Central Pacific Railway Company's land lies in the State of Nevada, and a much smaller part in Utah; but the company still owns a very large area in California.

The fact that to-day, out of the 17,000,000 acres of land granted nearly 50 years ago[1] to several then distinct corporations, as much as 13,880,000 (or about 80 per cent) is still retained in a single ownership, is of great significance to the public, and especially with reference to the particular issue here involved—the concentration of timber ownership; for this one holder, by virtue of its retention of land grants, is to-day the largest owner of timber in the United States.

Of its total acreage, no less than 3,840,000 acres is merchantable-timber land, carrying the immense amount of 105.6 billion feet of timber.

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[1] Dates of grants were from 1862 to 1871.

Present acreage of Union Pacific Railroad Company.—Part of the original land grant of the Union Pacific Railroad Company is now held by its subsidiary, the Union Pacific Land Company. The following statement from the annual report of the Union Pacific Railroad Company to stockholders shows the status of its land grants on June 30, 1910:

Table 55.—GRANTED LANDS OF UNION PACIFIC RAILROAD COMPANY (INCLUDING UNION PACIFIC LAND COMPANY) REMAINING UNSOLD JUNE 30, 1910, WITH ACRES SOLD, AND ACRES SURRENDERED DURING PRECEDING YEAR.

	Union Pacific Railroad Co.	Union Pacific Land Co.	Total.
Number of acres sold during year	205,542.96	4,474.67	210,017.63
Number of acres surrendered during year	8,296.04	5,141.00	13,437.04
Acres remaining unsold at end of year	966,174.62	8,952.88	975,127.50

The total acreage owned or claimed by the Union Pacific and its subsidiary, the Southern Pacific, on June 30, 1910, therefore, was 14,855,060 acres. This is equivalent to the land area of the five States of Massachusetts, Rhode Island, Connecticut, New Jersey, and Delaware. As observed above, much of this great acreage is nontimbered.

Section 5. The Northern Pacific grant.

The enormous grant to the Northern Pacific is the largest in area ever granted by the Government to any railroad. The company has already received over one-fourth of the entire amount patented by the Government to all railroads. The influence of this great grant in bringing about concentration of timber ownership is chiefly to be found in a study of the holdings of the Weyerhaeuser Timber Company, which is taken up in the next section. Yet notwithstanding the very large portion of its timber holdings sold to the Weyerhaeuser Timber Company, and over one million acres of less heavily timbered land sold to the Amalgamated Copper Company Interests in Montana, and other large sales, the Northern Pacific is still the third largest holder of timber in the United States.

The original grant (act of July 2, 1864, 13 Stat., 365) was of odd sections within a limit of 20 miles on either side of the road in States, and of 40 miles in Territories, with an indemnity limit 10 miles wide on each side of this primary grant, making a strip varying from 60 to 100 miles in width (according as it was located in a State or a Territory) within which the company was granted as much of its possible maximum as was available. By joint resolution of May 31, 1870 (16 Stat., 378), a second indemnity strip of 10 additional miles on each side was granted in any State or Territory of the grant in which such additional indemnity should prove necessary to enable the railroad to fill the possible maximum of the original grant. Selections within this second indemnity belt could be made only on account of lands disposed of subsequent to the grant of 1864, and were required to be in the State or Territory within which the loss occurred. Within the indemnity limits described, the railroad could select available lands in odd sections to make up, so far as possible, for lands found to be unavailable within the primary grant. No subsequent legislation increased the amount of land contemplated under the original grant.

Under these grants, up to June 30, 1910, a total of 32,664,651 acres had been patented.[1] If it were possible to find available locations within the indemnity limits, under the terms of the original grant, the railroad might still secure no less than 10,494,777 acres more. But owing to the fact that locations for such an acreage may not be available, the actual amount of additional land which the company can still obtain may prove to be considerably less.

The Northern Pacific grant, like all other railroad grants, was made on condition that the road should be completed by a certain time. The time limit in this case was 1877, possibly to be construed as 1879, but the road was not finished till 1888. Of the 2,138 miles of subsidized road built by the company, no less than 1,607 miles was built after the time set by law had expired.

There was also in an amendment to the Northern Pacific grant (resolution of May 31, 1870, 16 Stat., 378) a condition regarding the disposition of the granted lands to settlers in 160-acre tracts; but the conditional clause was far less strictly drawn than that in the Oregon and California Railroad Company's grant, on which the Government is now suing for forfeiture. The Northern Pacific amendment "provided, that all lands hereby granted * * * which shall not be sold or disposed of or remain subject to the mortgage by this act authorized, at the expiration of five years after the completion of the entire road, shall be subject to settlement and preemption like other lands, at a price to be paid to said company not exceeding two dollars and fifty cents per acre." It also provided that on foreclosure of the mortgage, the lands be auctioned in small tracts. At the 1875 foreclosure, by the court order, the lands, being mostly unpatented, were not so sold. At the 1896 foreclosure of later mortgages, all patented lands were so sold, but the new railway company was reported in every instance the highest bidder. As a result, no doubt, of the Government's entering suit in the Oregon and California case, a large number of persons have settled on the Northern Pacific lands in southwestern Washington, including lands sold to the Weyerhaeuser Timber Company, evidently with the idea that the resolution of May

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[1] This total acreage was distributed by States, as follows: Wisconsin, 10,354.99; Minnesota, 1,877,225.46; North Dakota, 10,643,228.87; Montana, 9,894,493.23; Wyoming, 51,914.17; Idaho, 831,591.11; Washington, 8,778,025.40; Oregon, 577,818.14; total, 32,664,651.37.

31, 1870, gave them the privilege of buying them at $2.50 per acre. The case of one of these settlers recently brought before the Land Office was decided against the individual claimant. (Heath *v.* Northern Pacific, 38 L. D., 77.) The decision intimated that the real issue as to the present effect of the condition was a question for the courts. In any event, however, it is established by many court decisions that Congress alone, rather than individual settlers, would have the right to challenge the railroad company for nonperformance of the condition.

ACREAGE STILL OWNED BY NORTHERN PACIFIC RAILWAY COMPANY.—The land holdings of the Northern Pacific on June 30, 1910, are stated in the company's annual report for that year to its stockholders as follows:

TABLE 56.—ACREAGE OF NORTHERN PACIFIC LAND GRANT REMAINING UNSOLD JUNE 30, 1910, WITH AMOUNT SOLD DURING PRECEDING YEAR.

State.	Sold during fiscal year 1910.	Balance undisposed of June 30, 1910.
	Acres.	*Acres.*
Wisconsin	520.00	681.86
Minnesota	2,854.03	28,331.97
North Dakota	8,733.30	2,116.05
Montana	377,433.48	6,876,966.62
Wyoming	19,746.33	39,506.16
Idaho	41,263.27	417,274.53
Washington	80,870.29	2,227,354.06
Oregon	20,193.45	[1] 318,515.33
Subtotal	551,614.15	9,910,746.58
Acquired from St. P. & N. P. Ry. Co. (in Minnesota)	320.00	38,321.77
Acquired from Little Falls and Dakota R. R. Co. (in Minnesota)	....	916.87
Total	551,934.15	9,949,985.22

[1] Most of this is nontimbered land. All the company's timbered land in Oregon is under contract of sale, and in the Bureau's timber tables is therefore credited to the purchasers and not to the Northern Pacific.

Of the 9,950,000 acres shown in this table, something over 3,000,000 acres are timbered, lying practically all in Washington, Montana, and Idaho. This timbered acreage, as shown in Chapter III, carries more than 36 billion feet of timber. The company is exceeded in amount of timber only by the Weyerhaeuser Timber Company and the Southern Pacific.

Section 6. Weyerhaeuser Timber Company holding based on Northern Pacific land grant.

No less than 1,525,000 acres, or 80 per cent, of the Weyerhaeuser Timber Company's great holding was originally part of the Northern Pacific land grant. The Weyerhaeuser Timber Company purchased the best part of the heavily timbered lands of the Northern Pacific in Washington west of the Cascade Mountains. Nine hundred thousand acres were purchased in one block in 1900 at $6 per acre, and contracts were entered into, chiefly in 1902 and 1903, for the acquisition of other Northern Pacific lands in Washington and Oregon, the average price paid for these being about $6.25 per acre. The greater part of these other lands consisted of such then unpatented lands in certain townships as the railway should subsequently get title to under its grant or by lieu selection. Including the original purchase of 900,000 acres, the Weyerhaeuser Timber Company and its Oregon subsidiary, the Weyerhaeuser Land Company, have acquired or contracted for from the Northern Pacific up to the present time, roughly, 1,350,000 acres in Washington and 175,000 acres in Oregon, making the total acquired from the Northern Pacific about 1,525,000 acres, as above stated.

Part of the lands contracted for in 1902 and 1903 are still unpatented, part even unsurveyed. The unpatented contract lands are approximately 200,000 acres, of which 190,000 acres are timbered. Title will pass to the Weyerhaeuser Timber Company if patents are issued by the Government to the Northern Pacific. On account of contests with settlers and for other reasons it is possible that the railway company, and consequently the Weyerhaeuser Timber Company, will lose a part of these lands. It will be seen, however, that the entire contract acreage which could be thus involved is relatively insignificant.

The important fact is that the holdings of the Weyerhaeuser Timber Company, the second largest timber owner in the United States, are substantially based upon the old railroad grant.

Section 7. Special lieu-selection acts affecting the Northern Pacific grant.

The Northern Pacific grant lies in Wisconsin, Minnesota, North Dakota, Montana, Wyoming, Idaho, Oregon, and Washington. The original grant covers only a little of Oregon. There had, however, been patented to the company up to June 30, 1910, 577,818 acres in that State. This is explained largely by lieu selections, which were provided for by special legislation, in addition to the general lieu-selection law of June 4, 1897, and amendatory acts.

The first of these special acts was that of July 1, 1898 (30 Stat., 597, 620), extended by the act of May 17, 1906 (34 Stat., 197). These acts grew out of the numerous cases of litigation between settlers and the Northern Pacific Railroad where both claimed the land. They provided that in pending cases of an adverse claim against the railroad, the settler or his heirs or assigns should be given the option of remaining on his land or of relinquishing it and selecting in lieu an equal area of nonmineral land, surveyed or unsurveyed, in any State in which the railroad grant extended. If he elected to retain his land, the railroad was required to relinquish its claim thereto and to take lieu selection. Lands in contest which had been sold or contracted by the railroad company, or which it used or needed for railroad purposes, or which were valuable for stone, iron, or coal, were exempted from the operation of the act. The Supreme Court has held that this exemption of sold lands applied only to lands sold or contracted prior to the passage of the act. (See Humbird *v.* Avery, 195 U. S., 480). Though the act resulted especially from cases of contest in that part of the grant between Duluth, Minn., and Ashland, Wis., it applied to contested lands anywhere in the grant.

A second special lieu-selection law affecting the Northern Pacific was passed in connection with the creation of Mount Rainier National Park by act of March 2, 1899 (30 Stat., 993). This provided for the relinquishment of the Northern Pacific lands, surveyed or unsurveyed, within the national park and within the Pacific Forest Reserve, and authorized lieu selection of surveyed or unsurveyed nonmineral lands in any State into which the railroad extended. The Pacific Forest Reserve was a large area in the rough mountain region adjacent to Mount Rainier, now included in Mount Rainier National Park and in the Rainier National Forest. Under this law the Northern Pacific relinquished its lands in the national park; it also relinquished a much larger acreage consisting mostly of comparatively worthless mountain lands in the Pacific Forest Reserve. The total relinquished was about 450,000 acres, for which valuable timbered lands in the northwestern States were obtained in lieu.

A large part of the lieu lands obtained by this exchange (or of the scrip used in selecting them) was sold by the Northern Pacific to the Weyerhaeuser Timber Company or to various western timber companies in which the Weyerhaeusers are interested. The following table shows by States the amounts of the lieu selections under this act now owned by various large timber holders. It will be noted that the ownership of about 38,000 acres is not accounted for. Part of this may also be owned by large timber holders.

TABLE 57.—PRESENT OWNERSHIP OF NORTHERN PACIFIC SELECTIONS OF LAND OBTAINED IN LIEU OF LAND RELINQUISHED TO UNITED STATES IN MOUNT RAINIER NATIONAL PARK AND THE FORMER PACIFIC FOREST RESERVE.

Present owner.	Oregon.	Washington.	Idaho.	Montana.	Minnesota.	Total.
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Northern Pacific Railway Co		2,857	9,800	40,851		53,508
Weyerhaeuser Timber Co.:						
Fee lands	119,708	49,723				169,431
Contract lands	40,335	10,097				50,432
	160,043	59,820				219,863
Clearwater Timber Co			67,660			67,660
Edward Rutledge Timber Co			22,132			22,132
C. A. Smith Fir Co.[1]	6,611					6,611
Hammond Lumber Co	5,140					5,140
T. H. Shevlin Interests			4,840		95	4,935
Cameron Lumber Co			4,120			4,120
Storey-Bracher Lumber Co	3,679					3,679
Cascade Timber Co		2,440				2,440
Alger-Smith Lumber Co					1,950	1,950
Panhandle Lumber Co		1,713				1,713
United States Steel Corporation Interests					1,296	1,296
Pine Tree and Mississippi River lumber companies					1,215	1,215
Western Timber Co		924				924
Humbird Lumber Co			840			840
Other lumber companies	3,320	2,351	1,440	40	1,050	8,201
Total accounted for	178,793	70,105	110,832	40,891	5,606	406,227
Selections not accounted for	[2] 10,924	10,094	9,527	[3] 5,768	1,498	[4] 37,932
Total	189,717	80,199	120,359	46,659	7,104	444,159

[1] C. A. Smith Interests at one time held 11,450 acres of these particular lieu selections in Oregon, but have since sold 4,839 acres, which are included in other entries of this table.

[2] Of this amount 9,382 acres consist of Northern Pacific selections under contract of sale to holders not known to the Bureau.

[3] About half of this unaccounted-for acreage in Montana lies in counties where there is little timber.

[4] Including 121 acres in North Dakota.

It must be remembered that this tabulation refers only to lieu selections made under the special law covering relinquishments in the Mount Rainier National Park and the Pacific Forest Reserve. It does not include those made under the general forest-lieu law of June 4, 1897, nor those made under the special lieu law of July, 1898, covering contests.

This table shows that the Weyerhaeuser Timber Company has secured about 220,000 acres of Northern Pacific selections taken in lieu of the lands relinquished in the area of Mount Rainier National Park and the former Pacific Forest Reserve. All these selections lie in western Oregon and western Washington, and are included in the 1,525,000 acres referred to in the preceding section as the total acquired from the Northern Pacific by the Weyerhaeuser Timber Company. Of the 220,000 acres about 50,000 is land under contract of sale, title having not yet passed to the Weyerhaeuser Timber Company, because the railroad has not yet received patent from the Government. Much of this land under contract is still unsurveyed. Of the other companies listed in the above table as now owning a considerable area of these particular selections, it is important to point out those which are closely associated with the Weyerhaeuser Timber Company, or other Weyerhaeuser companies, through common stockholders. Some of these companies in which the Weyerhaeusers and their close business associates have control are the Clearwater Timber Company, Edward Rutledge Timber Company, Pine Tree Lumber Company, and Humbird Lumber Company, while their close associates are prominent in the Cameron Lumber Company and Western Timber Company.

These lieu selections lie for the most part in well-timbered regions. A very high proportion in Washington and practically all in Oregon lie west of the Cascades. In Idaho the selections lie almost altogether in Shoshone and Nez Perce Counties, in the region of the valuable white pine. The 40,000 acres of these selections retained by the Northern Pacific in Montana lie in the better-timbered regions of the State.

It should be noted that this particular law of March 2, 1899, allowed the lieu selection of either surveyed or unsurveyed lands. This fact made the exchange right especially valuable, since lands could be selected before they were thrown open to entry on survey.

Section 8. Summary of effect of railroad, wagon-road, and canal grants on timber ownership.

From the foregoing it is seen that the retention or purchase of railroad land grants forms the foundation of the three greatest timber holdings in the country—retention in the case of the Southern Pacific and the Northern Pacific; purchase in the case of the Weyerhaeuser Timber Company.

These three holders, as stated in Chapter III, have 238 billion feet of timber. They have 14 per cent of the privately owned timber in the investigation area and approximately 11 per cent of all the country's privately owned timber. They own 238 billion feet, while the United States, which originally owned the whole of the timber in the public-land States, has preserved in public ownership but 539 billion feet—only a little more than twice the amount owned by these three corporations.

The owners of these great timber tracts will, after the timber has been removed, still have possession of vast tracts of land, the value of which is in many cases very great, and almost certain to increase enormously in the future. A considerable part of this land, which is now timbered, will, when denuded, be valuable for agriculture, and the remainder is natural forest land, which, if properly handled, will reproduce timber for generations to come. Part may contain great undeveloped wealth of oil, gas, and other minerals (though mineral lands, except iron and coal, were excluded under the terms of the grants). This local land monopoly, as it may fairly be termed, attains additional importance in the case of the two railroads mentioned because of their substantial control over transportation rates in large sections of their respective territories, and because of the power this gives them to retard or to direct to their own advantage the development of the country they traverse. The policy to be adopted by these railroads toward this land after the timber is removed becomes, therefore, a matter of deep public interest.

OTHER IMPORTANT HOLDINGS BASED ON GRANTS TO RAILROADS.—Many important timber holdings of less magnitude than the three just mentioned also consist wholly or in large part of lands originally comprised in railroad land grants. Without making a full investigation of this matter, the Bureau has traced, in certain large areas, the present ownership of lands originally included in various grants. The exact location of these areas and the detailed discussion of ownership of granted lands therein will be found in Part II (cf. also p. 255). Only the main facts are here summarized.

In an area comprising most of southwestern Washington the Northern Pacific's grant, including timbered and nontimbered land, amounted to about 2,415,000 acres. Of this, the Weyerhaeuser Timber Company now holds 1,230,000 acres, for this is in the region of its great purchase; and the Northern Pacific itself retains about 355,000 acres. But other large timber holders reported to the Bureau have no less than 340,000 acres of this granted land, in amounts ranging from 50,000 acres down. Thus, 80 per cent of the grant in this great region is now held by large timber owners, leaving only 20 per cent in small timber holdings and nontimbered land. In eastern Washington and in northern Idaho several important holdings are made up largely of granted land purchased from the Northern Pacific, but the Bureau has made no tabulation of the amount. In north central Idaho, out of at least 350,000 acres known by the Bureau to have been granted to the Northern Pacific in a certain area, the railroad retains about 175,000 acres, and six other large timber holders now own about 150,000 acres. In Montana the Northern Pacific's only sale of granted timber lands of any importance was the sale of over one million acres to the Amalgamated Copper Company Interests. In Oregon the Bureau traced the ownership of only 265,000 acres of the Northern Pacific grant, all being lieu selections. Of this, the Weyerhaeuser Timber Company now holds about 175,000 acres, and other large holders own about 70,000 acres, in amounts ranging from 12,000 acres down.

The Southern Pacific itself retains (subject to the outcome of the Government's pending suit for forfeiture) 72 per cent of its grants in Oregon. It has sold 370,000 acres, or 13 per cent, to large timber holders reported to the Bureau, the largest amount to any one holder being about 65,000 acres. The remaining 15 per cent unaccounted for is perhaps partly held by small timber holders, but is mainly nontimbered agricultural land. In an immense area of northeastern California also, the Southern Pacific has largely retained the railroad-grant lands. About 220,000 acres, however, is now owned by six other large timber holders.

The Great Northern Railway Company, through its subsidiary, the St. Paul, Minneapolis and Manitoba, is holding a timber reserve of about 50,000 acres of heavily timbered land in Washington, which it obtained as indemnity for lands not secured under its Minnesota grant.

The lieu selections for original Atlantic and Pacific granted lands relinquished in Arizona have been referred to on page 229. They were made by the Santa Fe Pacific, the present owner of the grant, and by four purchasers from the Atlantic and Pacific, viz, Aztec Land and Cattle Company, R. and E. B. Perrin, Wm. F. Baker, and Saginaw and Manistee Lumber Company. Some of these selections were restricted to nontimbered land. The unrestricted selections made in the name of the five holders amounted to some 735,000 acres, of which about 570,000 acres lay in the counties covered by the Bureau's timber investigation. Of this 570,000 acres 350,000 are owned by large timber owners reported to the Bureau, who purchased the "lieu scrip," and made their own selections of land. The amounts owned by separate holders range from 75,000 acres down. Most of these selections were located in the Pacific-Northwest, but 47,000 acres were in the South and 18,000 acres in the Lake States.

In west central Louisiana, in a large region covering part of the grant to the New Orleans Pacific, it was found that large timber holders reported to the Bureau now hold, in fee or as timber rights, 595,000 acres (90 per cent) out of the total of not quite 660,000 acres there patented under the grant. Ten holders have 440,000 acres of the railroad lands. A single holder has nearly 135,000 acres.

In Arkansas the St. Louis, Iron Mountain and Southern, nearly 60 years after the date of its grant, is still retaining over 570,000 acres, carrying a large amount of valuable yellow-pine and hardwood timber. This is over 40 per cent of its total grant. In the Upper Peninsula of Michigan the Michigan Iron and Land Company now owns 320,000 acres of granted land, constituting three-fourths of the total area of the Federal grants to the Marquette and Ontonagon, and Bay de Noquet and Marquette Railroads. In Wisconsin and Michigan the Chicago and Northwestern had Federal grants aggregating 1,065,000 acres. It still owns 370,000 acres, part of which may have been derived from State grants. The Bureau has not investigated the present ownership of the entire original area of the grants referred to in this paragraph, nor the ownership of the many other Federal railroad grants in these and other timbered States. There are indications, however, that a similar situation would be found wherever the grants traversed timbered regions.

IMPORTANT HOLDINGS BASED ON WAGON-ROAD AND CANAL GRANTS.—Wagon-road and canal grants also contributed to the concentration of timber ownership, though on a smaller scale. In western Oregon the grant to the Coos Bay Wagon Road Company, aggregating some 100,000 acres, is practically all now held in the ownership of a single company. The greater part of the land is very heavily timbered. The grant to the Corvallis and Yaquina Bay Wagon Road Company runs mainly through burned-over territory. Only 14,000 acres out of the 80,000 acres patented to this grant was reported to the Bureau by timber holders. The Oregon Central Military Road grant had received to June 30, 1910, a total of somewhat over 600,000 acres, much of it in the timberless region of eastern Oregon. The company now holding the western portion of the grant reports the ownership of 175,000 acres of granted timberlands. The Willamette Valley and Cascade Mountain Wagon Road grant of over 800,000 acres is now practically all in a single ownership, and about 180,000 acres of the western part is heavily timbered. The Dalles Military Road grant (embracing over 550,000 acres) traversed comparatively little of the timbered region of Oregon. The company now controlling the grant reported the ownership of 36,000 acres of granted timberlands.

In the Upper Peninsula of Michigan the Fort Wilkins, Copper Harbor, and State Line Wagon Road grant amounted to 220,000 acres. One estate now owns 174,000 acres of this, and three great copper owning and mining concerns own practically all of the remainder. The road traversed a large part of the rich Copper Range.

Three canal-construction projects received Federal grants in the Upper Peninsula of Michigan, aggregating about 760,000 acres.[1] Of this no less than 670,000 acres (or 88 per cent) is now reported to the Bureau as owned by large timber holders. The largest single holding of canal lands in the Upper Peninsula is over 300,000 acres.

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[1] The total acreage granted for these three canals was 1,250,000 acres; but about 490,000 acres of this, the present ownership of which has not been obtained by the Bureau, was selected in the Lower Peninsula of Michigan.

Section 9. Course of public sentiment regarding the Federal grants for means of transportation.

In the first fifteen years of the period during which the land grants for railroads, etc., were being made there was a strong popular demand for Federal aid to transportation projects.. But the corporations that proposed to carry out the projects in fulfillment of public demand were interested to secure as great private advantage as possible. This could be attained by influencing the choice of routes for the roads, especially so as to traverse the most valuable lands; and by securing grants with as few restrictions as possible, and those restrictions loosely drawn. The public demand was largely directed by the interested parties, and Congress, liberal in its grants of what then seemed an inexhaustible public domain, neglected those safeguards that now appear essential to good policy.

Some of the grants, it is to be presumed, went through, as Douglas said of the Illinois railroad grant of 1850, "without a dollar, pure, uncorrupt."[1] In other cases, however, the evidence leaves little doubt that there was corrupt use of money, or of stock or land bonds of the prospective railroad, to secure grants, extensions of time, or other privileges.[2]

POPULAR CONCEPTION OF LAND-GRANT POLICY.[3]—In the popular mind the grants in aid of internal improvements were conceived as a means of opening undeveloped parts of the public domain to settlement by providing transportation facilities. It is clear, therefore, that grants on terms that would fail to promote rapid settlement could scarcely have been contemplated, much less grants on terms that would hinder it. The public idea was that the lands would be sold to the producing agricultural class that would settle the areas tributary to the railroads, and thus the cost of constructing the road would be largely met, and at the same time substantial and permanent benefits would result to the public.

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[1] The Public Domain, p. 262.

[2] See H. Rept. No. 352, 33d Cong., 1st sess., 1854, for an investigation resulting in a repeal (10 Stat., 575) of a grant to the Territory of Minnesota.

Also for bribery of the State legislature and State officers by a certain company to secure its designation as beneficiary of one of the Federal railroad grants to Wisconsin, see Report of Joint Select Committee Appointed to Investigate into Alleged Frauds and Corruption in the Disposition of the Land Grant by the Legislature, 1856, and for Other Purposes, Madison, Wis., 1858, 48 pp., with 322 pp. of testimony.

For investigation of alleged corrupt combinations of Members of Congress to secure or prevent the passage of measures in the Congress of 1857, especially land grants and bills conferring special privileges, see H. Rept. No. 243, 34th Cong., 3d sess., pp. 15–19, 28–38, and testimony, pp. 54–219. The expulsion of three Members was recommended by the report, but it was stated that there was no evidence of any general combination of Members of Congress for the purposes alleged. The three Members resigned.

For an agreement between certain promoters of the Northern Pacific in 1867, see H. Rept. No. 1498, 50th Cong., 1st sess., Apr. 3, 1888.

For specific charges of bribery in securing the Texas and Pacific grant in 1871, see S. Doc. No. 27, 48th Cong., 1st sess., vol. 1, Dec. 20, 1883. The grant was forfeited in 1885.

For an account of the Crédit Mobilier scandal over the construction of the Union Pacific Railroad, involving several Members of Congress, see H. Repts. Nos. 77 and 78, 42d Cong., 3d sess., vol. 2, Feb. 18 and 20, 1873. Also H. Repts. Nos. 81 and 82 in the volume just referred to, and S. Rept. No. 519, 42d Cong., 3d sess., Feb. 27, 1873. As a result of these reports an act directing, among other things, the bringing of a suit was enacted (17 Stat., 509). Suit was brought, but the bill was dismissed by the lower court, and the dismissal was sustained by the Supreme Court (98 U. S., 569).

[3] Most of this and the following subsection from p. 244 to p. 247 is summarized, and in places taken verbatim (with or without quotation marks), from a review of the land-grant policy by Government counsel in the brief on the Oregon and California Railroad case (U. S. *v.* Oregon and California R. R. Co. et al.), in Circuit Court for the District of Oregon; in equity, No. 3340; argument on behalf of United States on demurrer of defendants (pp. 430–491). This brief contains a valuable historical sketch of the entire land legislation of the United States as well as of the land grants.

When the grants through the agency of the States were being made, the public did not realize that the State legislatures in their disposition of the lands would fail to protect the general public.[1] In these grants, as well as in those direct to corporations, it was natural to assume that the railroads would distribute their lands to settlers whose industry would build up a profitable traffic. In the first place, only lands classed as agricultural were granted, timberlands being regarded as susceptible of clearing and settlement. Indeed, till 1878, the date of the timber and stone act, the only land classifications recognized in the law were agricultural and mineral; and except in a few early cases mineral lands were excluded from the grants.[2] Moreover, it was conceived that the checkerboard style of grant, the Government retaining the alternate sections, would result in the railroad lands being disposed of much as the Government lands were; that both sharing equally in the benefits resulting from construction of the roads, they would be equally desirable, so that the Government "double minimum" price of $2.50 per acre would establish a maximum for railroad lands. Probably few persons considered the likelihood that great numbers of the alternate railroad sections might be sold to single speculative purchasers who would hold them at a higher price, or that great tracts might be retained for any extended period of time by the railroads themselves; and that, even with the checkerboard style of grant, there was danger of land concentration and retardation of development.

That the policy of settlement and wide distribution of public lands was rapidly becoming paramount in the public mind is attested by the change from early grants altogether prohibiting preemption of lands in the intervening sections to grants allowing settlers to take 80-acre free homesteads in those sections; from provisions forbidding settlement on granted lands to provisions extending relief to settlers on lands found to be part of a grant, and provisions expressly permitting settlement on granted lands down to the time of their withdrawal on filing a map of "definite location" of the road. All these changes were in accord with the land policy of the Nation that found expression in the free-homestead law of 1862.

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[1] The acts of Congress granting the lands to the States usually followed the language of the act granting lands to Missouri (10 Stat., 8), which provided "That the lands hereby granted to said State shall be disposed of by said State only in manner following, that is to say: that a quantity of land not exceeding one hundred and twenty sections on each road, and included within a continuous length of twenty miles of said road, may be sold; and when the Governor of said State shall certify to the Secretary of the Interior, that said twenty miles of said road is completed, then another like quantity of land hereby granted may be sold; and so from time to time, until said road is completed; and if said road be not completed within ten years, no further sales shall be made, and the land unsold shall revert to the United States." In nearly all cases the State legislatures simply conferred the grants as entiroties, with the privileges and conditions attached by Congress, to the companies designated to build the roads. The grants through States, therefore, in general came into the hands of the beneficiaries without any restriction as to their disposition other than that imposed by Congress, that they should not be sold before they were earned.

[2] The Pacific railroad grants excluded mineral lands other than coal and iron lands.

Experience, however, showed the necessity for specific conditions requiring the disposition of the railroad lands in such manner as to promote settlement. The enactment in the grant for the Union Pacific route was the first condition looking in this direction. This grant being in a sense a war measure, speedy completion of the road was perhaps regarded as paramount to other considerations. However, it was required (ineffectively, as noted on p. 231, above) that lands not sold or disposed of within three years after the completion of the road should be subject to settlement and preemption, like other lands, at not more than $1.25 per acre, to be paid to the company. With provisions for a popular subscription to the stock, limitations on the amount one person should acquire,[1] a Federal representative on the board of directors, and direct responsibility of the corporation to the United States, the Union Pacific Railroad was generally regarded as largely in the nature of a public enterprise.

PUBLIC CONFIDENCE ABUSED.—In the years immediately following the war, however, the actual workings of the railroad grants began to shatter confidence in the system. The great revival of industry quickly following the war was accompanied by an unparalleled movement of settlers westward, particularly along the line of the Union Pacific Railroad, to develop the resources of the opening country.

The capacity of the Union Pacific was overtaxed with traffic. The enterprise was so profitable that the promoters and officers of the company could have fulfilled every moral and legal obligation to the public. Instead, "the subsidy of bonds and lands, intended to promote the success of the enterprise and at the same time conserve the general interests of the Nation, was perverted into means of enriching a few financial adventurers. * * * By fictitious stock issues, fraudulent and collusive construction contracts, and other equally dishonest practices the work of looting the enterprise * * * was carried out."[2]

The opportunity to manipulate the land grant was not overlooked. Lands were disposed of in large blocks to speculators; in many instances, it was charged, they were sold, at small prices, to development companies collusively organized for that purpose by some of the promoters and officers of the railroad. Thus the corporation received only partial benefit of the grant and the settler was compelled to make terms with the speculator.

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[1] By the original act of 1862 no person could acquire more than 200 shares of stock, but by amendment of 1864 this provision was repealed.

[2] Government brief above cited, p. 450.

This manner of handling the land grants was not confined to the Union Pacific and other Pacific railroads. Other grants were exploited in the same general manner, and with the same injurious effects upon the development and settlement of the country.

These abuses resulted in vigorous protests addressed to Congress complaining of the manner in which these land grants were being handled. These protests "came from all parts of the country and from the substantial and representative elements of the Nation. Public sentiment upon the subject was expressed through the public press, legislative memorials and petitions signed by thousands of individual citizens, all directing the attention of Congress to the demoralizing effects of the methods practiced by the railroad companies. The very conscience of the Nation was aroused."[1]

This aroused public sentiment was given effect in the policy adopted by Congress in 1869 of attaching to new or revived grants of public lands a strict condition requiring the sale of the granted lands to actual settlers only, in 160-acre tracts, at not more than $2.50 per acre. This condition was attached to two expired grants that were revived and to one new one. One of the revived grants was that of the Oregon and California Railroad Company (now a subsidiary of the Southern Pacific Company), and the new grant was that of the Oregon Central, which was subsequently acquired by the Oregon and California. The other revived grant was that now owned by the Alabama and Chattanooga Railroad Company in Alabama. The same condition was attached in 1869 to the grant of 100,000 acres for the Coos Bay Wagon Road Company in Oregon.

However, in two important grants made after 1869 conditions were substituted which have so far proved ineffective. Reference has already been made (p. 235) to one of these cases—the amendment to the Northern Pacific grant, in the resolution of May 31, 1870 (16 Stat., 378), imposing certain conditions concerning alienation. In the Texas Pacific grant of 1871 (16 Stat., 573), and one other grant made by the same act—that of the New Orleans Pacific in Louisiana—a condition on alienation was inserted even weaker than the one held to be ineffective in the case of the Union Pacific grant. The terms of the act itself allowed the condition requiring sale in small tracts to be avoided by mortgaging the lands. The Texas Pacific was forfeited before the road was constructed, but in the case of the New Orleans Pacific grant the lands acquired were not sold in small tracts.

With the act of 1871, which was subsequently attacked as obtained by bribery, the making of grants came to an end. The early public demand for them had changed to a determined opposition.

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[1] Government brief above cited, p. 451.

FAILURE OF RAILROADS TO BUILD THEIR LINES WITHIN TIME SPECIFIED.—In practically every land-grant act a time limit was set for the completion of the road. The importance of this was obvious. If it had been desired to wait till the gradual development of the various regions would assure a profitable operation of railroads, railroads could have been had without subsidy. The only object of subsidy was to secure railroads early enough to aid the pioneer development, instead of having them follow after such development had occurred. In the grants through the agency of the States it was provided that if the entire road was not finished in a given time (usually 10 years) all the unsold railroad lands should revert to the United States. The grants direct to corporations were conditioned on the completion of the road within the time limit. Some of the grants even required the building of a specified number of miles each year, a requirement which would open up the regions along the line in orderly progress. In both kinds of grants many extensions of time were made by Congress.

While time was a vital condition of the grants, yet 40 out of the 80 or more subsidized roads were not completed within the time set by law nor within the extensions granted. This fact, therefore, constituted an important failure of the consideration demanded in return for the lands. Since the lands in alternate sections along the route of the roads were withdrawn from settlement,[1] and remained so till the railroads earned them by construction, it followed that where the roads were not built till long after the time limits had expired millions of acres of unearned railroad lands were for years tied up from use and settlement. Meantime, the value of the railroad lands and of railroad traffic was being enhanced by the fact that settlers were coming in on the alternate sections, thus tending to give the railroads a large business from the start.

The panic of 1857, the war, and afterwards the panic of 1873 contributed to the long series of failures to build the roads within time, but very largely the failures were due to the reckless and fraudulent management of railroad companies during this period.

EFFORTS TO ENFORCE FORFEITURE FOR VIOLATION OF THE CONDITIONS OF THE GRANTS.—In the early years, when breaches of the time conditions occurred, it was the practice of the General Land Office, in the absence of any reviving act by Congress, to restore to entry the lands or the part remaining unsold, considering that they had *by the breach* reverted to the United States. But in 1874, in a case involving a Federal railroad grant to Wisconsin (Schulenberg *v.* Harriman, 88 U. S., 44), the Supreme Court decided that the grant was not forfeited ipso facto by failure of the company to build in time; that such failure was merely a ground for declaration of forfeiture by Congress and in absence of such declaration the grant remained in force. In other words, action by Congress itself was necessary to recover the lands. The delinquent railroads, therefore, in many instances continued building after the time limit had expired. The decision in Schulenberg *v.* Harriman was followed by a long line of affirmative decisions, some of which extended the principle to the grants direct to corporations. Prior to the decision of the Supreme Court it had apparently been the general opinion among administrative officers and legislators that forfeitures in such cases required no positive action. The decision, however, clearly required initiative by Congress. It therefore gave every reason for an early consideration of forfeiture acts.

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[1] A few early granting acts directed immediate withdrawal of lands which would "probably" fall within the grant; up to 1862 the withdrawals were usually made by the Interior Department before the final passage and approval of the acts; after that date the acts provided for withdrawals on filing of a map of general route, or, in some cases, not till filing of map of definite location.

During the eighties and early nineties the question of forfeitures for breach of the time condition was prominently before Congress.[1] Three different positions found adherents. One group contended that failure to build any part of the road in the time or at the rate required should work a forfeiture of the entire grant. Another group contended that failure to build part of the road within the final time limit (irrespective of rate) should work a forfeiture of the grant as to that part. In case a company had continued to build after the expiration of the time limit, this group did not wish to allow it any lands for the part built out of time. The third group contended that lands should be forfeited only opposite road not constructed at the date of the forfeiting act. It would give lands for as much road as was built up to the date of actual forfeiture. These opposing views and legal arguments for and against each were set forth at length in debates and in committee reports.

The first forfeitures were of particular grants. In 1885 the grant opposite the then uncompleted portion of the Oregon and California Railroad from Forest Grove, Oreg., to the coast at Astoria was forfeited; and also the entire Texas Pacific grant, none of the road having been built. In 1886 the part of the Atlantic and Pacific grant opposite then uncompleted road was forfeited; and also several smaller grants in Alabama, Mississippi, and Louisiana where the roads had not been built. Unsuccessful attempts were made to enact legislation forfeiting the Northern Pacific, Southern Pacific, and other important grants where the companies were still building, although the time limit had expired.

General forfeiture bills covering all roads where there had been default in construction were also introduced. The House of Representatives by substantial majorities took the second position mentioned above, favoring forfeiture of land opposite road not built in time, even though subsequently built. The Senate, however, repeatedly refused to agree to bills embodying this principle as passed by the House. Meantime, while Congress debated, many of the roads in default continued their building. Finally, on September 29, 1890, the Senate measure, forfeiting only grants opposite roads then unconstructed, was accepted by the House and became law (26 Stat., 496). The act, it was estimated, forfeited not much more than 5 million acres; while the House bills would have forfeited 54 million. If the Senate measure itself had been passed in the early eighties, millions of additional acres would then have been forfeited that by 1890 were secured by the railroads through construction in the meantime. In 1892, and again in 1894, the House passed general forfeiture bills along the lines of its original position, but the Senate refused to indorse them.

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[1] From 1870 to 1877 a few relatively unimportant railroad grants in Louisiana, California, and Kansas had been forfeited for failure to construct the road.

Whether Congress has the legal right to forfeit the lands that the House bills would have forfeited has never been determined; Congress has at no time declared a forfeiture of the grant opposite any constructed piece of road, on the ground of breach of time condition, and its right to do so has therefore never come before the courts. Neither the general act of September 29, 1890, nor the earlier special forfeiture acts, made any provision validating those parts of grants where the road was not constructed until after the time set.

The forfeitures hitherto referred to were for failure to build the road. But in 1908 the land-grant question came up from a new angle —the failure to comply with the conditions regarding the sale of the granted lands. In that year a memorial of the legislature of Oregon, in the matter of the alleged violation of such a condition by the Oregon and California Railroad Company (a subsidiary of the Southern Pacific Company) was brought before Congress. As a result, suits for forfeiture of the Oregon and California Railroad Company's grants and also the Coos Bay Wagon Road grant, made on a similar condition, were authorized. These suits challenge, not the right to receive the granted lands, but the failure, after acquisition, to dispose of them in the manner provided by law. This is the first time that the Government has declared or sought forfeitures of internal improvement grants for breach of such conditions prescribing the manner of disposal.

The specific ground of the suit against the Oregon and California Railroad Company is the alleged violation of the condition attached to its grants in 1869 and 1870, requiring that the lands should be sold to actual settlers only, in tracts not exceeding 160 acres each, at a price of not more than $2.50 per acre. It is charged in the Government's bill of complaint that, out of 820,000 acres sold by the company, a very large amount (alleged to be over 500,000 acres) was sold in violation of the condition. Of this 500,000 acres, about 370,000 acres are alleged to have been sold to only 38 purchasers, chiefly large timber owners. Another violation of the grant charged against the railroad is its retention of 2,074,454 acres of its grant (see p. 230), and its refusal to sell the same to settlers. For, since January 1, 1903, the company has for all practical purposes entirely withdrawn its Oregon lands from the market.

The lower Federal court (Judge Wolverton) in April, 1911, overruled the company's demurrer to this suit, and sustained the Government in its crucial contention that the grant was "on condition subsequent," and consequently forfeitable if the condition were broken (186 Fed., 861, 923). The case will presumably be appealed ultimately to the Supreme Court.

The Coos Bay Wagon Road grant is now practically all held by the Southern Oregon Company, and the points of law involved in the pending suit against this company are similar to those in the railroad case.

In the case of the lands involved in the breach of the conditions of the Oregon and California Railroad Company grants, the Attorney General confined the entering of suits to that against the railroad itself for the unsold lands and to those against the 45 purchasers who had bought more than 1,000 acres each from the railroad. This administrative action, coupled with the enactment by Congress at the last session that no suits for recovery of other lands purchased from this railroad company in violation of the condition should be brought after one year from the date of the act, will effectually secure the title of those who own small acreages, and thus prevent a general unsettling of titles.

If the Government should be successful in the case against the Oregon and California Railroad Company, this recovery would restore to public ownership 70 billion feet of timber, or over one-sixth the privately owned timber in Oregon. Congress, in the recent act referred to above, provided that if the Oregon and California Railroad Company's unsold lands should be adjudged forfeited, they should not be open to entry. By this action these lands, if recovered, will be kept in public control.

The fact that Congress, on information presented to it, has authorized the Oregon and California and Coos Bay suits for alleged violation of conditions imposed over 40 years ago, suggests the propriety of a searching inquiry whether nonfulfillment of the various conditions attached to the Northern Pacific and other grants, including time conditions, would possibly give Congress just and legal cause to seek further forfeitures.

Obviously, any recovery of large holdings of granted timberlands held to be legally forfeitable would in so far lessen the present concentration of timber ownership.

Section 10. Extent and character of general land grants to States.

Besides the 190,000,000 acres of special land grants for railroads and the 8,990,000 for wagon roads, canals, and river improvements, the Federal Government made general grants to the States amounting, roughly, to 170,000,000 acres. Most of the grants were to the public-land States, which include Wisconsin, Michigan, Illinois, Indiana, Ohio, Mississippi, Alabama, and Florida, and all States west of the Mississippi River except Texas. They comprised grants for common-school purposes, the sixteenth section out of each township in States admitted before 1848, and the sixteenth and thirty-sixth sections in States admitted after that date; grants for general internal improvements, in most cases 500,000 acres to each State; grants for drainage purposes, giving to the States all swamp lands within their borders; grants for colleges of agriculture and mechanic arts,[1] and others less important in amount.

The Bureau has not given special attention to the manner of alienation by the States of timberlands acquired under these various grants. In certain States, however, the matter has been somewhat looked into, and there it has been found that many large blocks of land now in the hands of large timber holders were originally part of the State grants.

Some of the States sold direct to lumbermen without limitation of amount. Others allowed entries only in limited amounts by persons alleging intent to settle and taking oath that they had made no agreement to transfer the land to others. Yet even in such States, either by the looseness of the laws or by violation of them, large holdings were built up from State lands. The price received by the States was commonly only $1.25 per acre, though in recent years prices have been sharply raised. In these ways many of the States have disposed of their lands rather freely and in such manner that valuable tracts of timber were eventually acquired by large holders at a low price. In Oregon two large timber holdings consist almost entirely of State school lands in sections 16 and 36. The State has already disposed of by far the greater part of its grants, much at low prices. In certain large areas in northeastern California it was found that, out of 360,000 acres selected by the State under its various grants, almost two-thirds is now owned by large timber holders. One holder, Thomas B. Walker, has more than 125,000 acres of this land; three others together have 65,000 acres of it. In Idaho the State has sold the timber on large tracts to lumber companies but has retained the fee.

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[1] Grants for colleges of agriculture and mechanic arts were made to all States. Those which were not public-land States received scrip instead of land. This was sold, the buyer being then allowed to select land in the public-land States to the amount of the scrip he had bought.

The agricultural college scrip was often sold outright in large blocks. As early as 1867 a company advertised that during the two preceding years it had bought all the scrip issued to the States of Kentucky, Indiana, Maryland, North Carolina, and New Hampshire, and the greater part of that issued to Massachusetts, Ohio, and Pennsylvania; enough, with smaller lots, to make a total of over 3,000,000 acres. The amount of this scrip granted to all the States was only 7,800,000[1] acres; by 1867, according to this statement, two-fifths of it had passed to a single company. This company, no doubt, resold the scrip instead of itself locating the land.

Some States granted large amounts of their swamp lands and internal-improvement lands directly to railroads. Florida, whose entire area is less than 35,000,000 acres, received a swamp grant of over 20,000,000 acres. Up to 1910 its grants to railroad, canal, and drainage companies, and compensation to State agents for selecting swamp lands, together with a single sale of 4,000,000 acres, had absorbed about 16,000,000 acres out of not quite 19,000,000 acres disposed of.[2] Much of the swamp grant outside of the Everglades was covered with pine and cypress; and a great part of the present high concentration of timber ownership in the State is due to the policy adopted in disposing of the grant. Michigan also granted large amounts of its swamp lands to railroads. The Cleveland Cliffs Iron Company Interests now own 890,000 acres of swamp land in the Upper Peninsula, purchased from the railroad to which the State had granted it.

The original swamp-land grant (act of Sept. 28, 1850, 9 Stat., 519) granted the lands with a provision for their drainage and reclamation. The great bulk of the land, however, still remains undrained. What effect the failure to drain may have on the present title seems to be an undetermined question.

In Minnesota, according to Samuel G. Iverson,[3] State Auditor, whose office is charged with the administration of the State lands, the Federal land grants to the State (excluding the Federal railroad grants) amounted to 8,150,000 acres, of which about 2,955,000 acres were common-school lands and 4,460,000 acres swamp lands. The State has sold or granted nearly 5,670,000 acres. Of this over 2,850,000 acres was swamp land granted by the State to various railroads, as shown in Table 58.[4]

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[1] See The Public Domain, pp. 229-231, for the acreage of scrip received by each State and the amount realized from its sale—usually less than $1 per acre.

[2] See the Eleventh Biennial Report of the Commissioner of Agriculture of the State of Florida, 1909-10, p. 645.

[3] Address on the Public Lands and School Fund of Minnesota, by Hon. Samuel G. Iverson, State Auditor, p. 14 ff. Delivered at the monthly council meeting of the Minnesota Historical Society, Feb. 13, 1911, and published by the society.

[4] Ibid, p. 24.

TABLE 58.—SWAMP LANDS GRANTED TO RAILROADS BY MINNESOTA LEGISLATURE.

Date of act.	Grantee.	Acres granted.
Mar. 8, 1861	Lake Superior & Mississippi (now St. Paul & Duluth) R. R. Co.[1]	694,399
Do	Taylors Falls & Lake Superior (now St. Paul & Duluth) R. R. Co.	91,830
Mar. 5, 1863	St. Paul & Chicago (now Chicago, Milwaukee & St. Paul) R. R. Co.	462,336
Feb. 11, 1865	Minneapolis & St. Cloud (now Great Northern) R. R. Co.	425,664
Feb. 16, 1865	Southern Minnesota Railroad Co.[1]	36,778
Mar. 2, 1865	Minnesota Central (now Wisconsin, Minnesota & Pacific) R. R. Co.[1]	275,000
Mar. 9, 1875	Duluth & Iron Range R. R. Co.	600,214
Mar. 3, 1881	Little Falls & Dakota R. R. Co.	265,856
		2,852,077

[1] Company also received a Federal land grant.

In spite of these great gifts of 2,852,000 acres to railroads, the State, by its policy as to the rest of its lands, has already received from sale of lands and from timber and ore leases the sum of $27,000,000, of which nearly $22,500,000 is invested as a permanent educational fund. The sales of timber alone have already brought $7,000,000, a fair price per thousand feet being received for the actual scale of logs cut and the State retaining the land. (For a table of the price received, by years, see p. 200 above.) It is estimated that the State has enough timber left to realize $7,000,000 more. Besides, it still has 2,485,000 acres of patented lands, mostly swamp and school lands. Approximately 600,000 acres more, now in the course of selection and approval, are claimed by the State.

The discovery of iron ore on cut-over lands of the State emphasized the wisdom of its policy of retaining the fee of its timberlands. Following the ore discoveries a similar policy of retaining the fee of all its lands in the ore region and leasing mineral rights at a royalty of 25 cents a ton was adopted. This policy will, according to calculations based upon the present royalty, ultimately bring the State the immense sum of $187,500,000[1] for ore. This calculation does not include very large areas of State lands scattered over northern Minnesota which may in the future prove to contain ore.

The State of Minnesota, according to Mr. Iverson, will receive more revenue from a certain 120 acres of swamp lands containing ore deposits, leased by the State for a royalty, than the States of Wisconsin and Michigan together received from the sale of all their lands. This 120 acres lies near Hibbing, Minn., in section 12, township 57 north, 21 west, and is called the "Scranton mine." According to the ore estimates, the State's royalties from this mine will ultimately reach $10,000,000.[2] Concerning another section (640 acres) of school land, Mr. Iverson says:

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[1] Address above cited, p. 25.

[2] Ibid., p. 22.

> The Minnesota school fund will * * * receive more money from one section of school land, the Hill iron mine, than the States of Michigan, Wisconsin, and Iowa combined have received or will ever receive from all the lands granted to them by Congress.[1]

The State of Washington also, it should be said, still retains from its grants a very large body of valuable timberlands, and Montana and Idaho hold smaller amounts. In general, however, the instances that have come to the Bureau's knowledge suggest that throughout the timbered area the land policy of the States has done much to further the present concentration of timber ownership.

In Part II of this report details will be given for many of the condensed statements in this chapter regarding the present ownership of lands originally forming part of the Federal and State grants. This will be done in connection with the discussion of timber and land maps showing ownership in certain large selected areas in Washington, Oregon, California, Idaho, Louisiana, Michigan, and Florida. It was principally in these areas selected for mapping that the comparisons were made to determine how far the lands originally forming part of the great grants are now owned by large timber holders.

GENERAL LAND LAWS.

Section 11. Principal statutes.

The most important general land laws of the United States were the private-sale law; the act making military-bounty land-warrants assignable; the preemption law; the homestead law, with its commutation feature; and the timber and stone law. Historically, the underlying theory of the early land policy was that the public lands should be sold for revenue. To this end settlement without legal title was at first prohibited. Sales of land in unlimited tracts were made, credit being allowed at first; but after the breakdown of this system through overspeculation in land, the sales were strictly for cash.

In the later development of the land policy emphasis began to be laid on the rights of the settler as against the mere land speculator, and various acts were passed, culminating in 1841 in the act known as the preemption law, which gave the settler a preference right to buy at $1.25 per acre one 160-acre tract in consideration of his residing thereon and improving it. This tendency toward favoring the settler seems at odds with the making of the immense land grants in the 20 years succeeding 1850. But, as pointed out above, the expectation was that the railroads would dispose of the lands to settlers much as the Government was doing; and when it was found that this was not being done public sentiment demanded that whenever new grants were made or old ones revived conditions should be imposed requiring sale of granted land in small tracts to actual settlers.

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[1] Address above cited, p. 2.

The homestead law of 1862 carried the preemption law a step further, by giving one 160-acre tract free in consideration of residence and cultivation. This law made the preemption law unnecessary, yet the latter was not repealed till 1891. The abuse of these laws in the timber regions will be pointed out below, but on the whole they were of substantial benefit in the agricultural development of the country.

The timber and stone law of 1878, which has conspicuously failed to accomplish its apparent purpose, was originally urged on the ground that the settler, limited to his 160 acres of cultivated land, needed a "wood lot" to supply timber for his domestic use; and that for local commercial use, in districts where the public lands had not been offered for sale, there was no legitimate way of getting timber from the public domain. Within five years the practical effect of this law in transferring public timberlands almost directly to large corporations and timber speculators was recognized in official reports, and its repeal was strongly urged. It nevertheless still remains in effect.

After this brief survey of the principal land laws to show their relation to one another, the discussion of their effect on the concentration of timber ownership may be taken up in some detail.

Section 12. Private cash sale of Government land.

The private-cash-sale law, which was in force with various modifications from 1820 to 1889, provided that the land should first be put up at auction for sale to the highest bidder at not less than $1.25 per acre. But land thus "offered" at public auction without takers could then be sold at private sale for $1.25 per acre flat (later raised to $2.50 per acre within primary limits of railroad land grants). There were few bidders at public auction, and the great bulk of the land sold was sold under the private-sale plan rather than at public sale. The amount of land thus sold by the Government for cash at private or public sale was probably over 150,000,000 acres,[1] though no official statement of the actual quantity has been made.

There was no limit to the amount of land that one individual or corporation could thus acquire at private entry direct from the Government. Though only one section, 640 acres, could be acquired in one purchase, a buyer could make as many purchases as he pleased.

By the operation of this law the ownership of timberlands in the Lake States, and especially in the South, passed directly into private hands, and in tracts of considerable size. Such tracts bought direct from the Government at $1.25 per acre formed the nucleus of some of the present large timber holdings. Since timber speculators did not go extensively into the far western field so early as into the South and the Lake States, it is probable that this law, repealed in 1889,[1] had less effect in the Pacific-Northwest than in the other regions named. But in the timbered regions of the Lake States and the South millions of acres of the public lands passed by this law into the hands of speculators and capitalists at a flat rate of $1.25 per acre.

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[1] Including the 25,696,000 acres sold in small tracts to settlers under the graduation act of 1854 for less than $1.25 per acre. See Report of the Public Lands Commission, 1905 (S. Doc. No. 189, 58th Cong., 3d sess.), pp. 199–282, for sales at private entry for cash from July 1, 1880, to June 30, 1904, by States.

In 1866 it was estimated that the United States owned more than 40,000,000 acres in the five public-land States in the South—Florida, Alabama, Mississippi, Louisiana, and Arkansas.[2] In that year Congress enacted that all public lands in those States should be reserved for settlement under the homestead act, the maximum amount to be entered by one person in those States being 80 acres. This was in line with the policy of encouraging negroes to take up land and cultivate it for themselves. It excluded the land in these States from the operation of the cash-sale act, leaving the land strictly for the settler rather than for the speculator. From 1866 to 1883 there were 121,964 homestead entries under this act, covering 12,187,812 acres.[3] Many of these entries, however, were fraudulent.

> It was no uncommon thing for one person or one firm engaged in the timber or turpentine trade to procure to be made large numbers of homestead entries with apparently no intention of complying with the law.[4]

While the act of 1866, on the whole, encouraged settlement, it was repealed by Congress on June 22, 1876, and thus the public lands in these five States once more came under the operation of the cash-sale law.

With reference to this repeal the following statement was made in The Public Domain (1884):

> It was claimed that the passage of the act of June 22, 1876, would enable persons to at once acquire titles to homes without waiting the long period required under the homestead act. Besides, it was urged that, as much of this land was covered with valuable timber, the Nation would secure a greater price than $1.25 per acre, it being worth a great deal more at public sale. This was and always is mere subterfuge. It is a cunning device to pass a cash or private sales law. * * * The sales are advertised; a few persons come to the land office where offered; scarcely anyone bids. The lands thus become offered, are so marked on the plats, and are thereafter sold for cash in unlimited quantities at $1.25 per acre. This is going on at this date in the Southern States, and especially in Alabama, under the act of March 3, 1883. * * * Any person, citizen or alien, can at this hour buy a million acres of the public lands, not occu-

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[1] Act of Mar. 2, 1889 (25 Stat., 854).

[2] The Public Domain, p. 546.

[3] Ibid., p. 544.

[4] Ibid., p. 542.

pied by settlers, in any of the five Southern States, at $1.25 per acre—timber, mineral, and agricultural.[1]

The sales in five Southern States during the fiscal year 1882 were, at public offering, 2,033 acres, and at private sale, 830,406 acres. In the fiscal year 1883 they were, at public offering, 5,229 acres, and at private sale, 1,103,406 acres.[2]

The Bureau has made no extended study to determine how far the cash-sale law has aided the concentration of timber ownership. A study was made, however, of a large area in west central Louisiana where it was found that 65 purchasers originally secured from the Government under this law 1,000,000 acres, in amounts ranging from 1,000 acres to over 100,000 acres to a single purchaser. Of this, about 950,000 acres (95 per cent) is now held by timber owners reported to the Bureau. The 13 largest original purchasers of cash-sale lands in this area bought 670,000 acres. The 13 largest present owners of cash-sale lands hold 835,000 acres of such land in fee or as timber rights. Several of the original purchasers of large tracts still retain an interest in them to-day as stockholders in the corporations that now hold title.

Similarly, in the Upper Peninsula of Michigan it was found that the Cleveland Cliffs Iron Company Interests alone are the present owners of 200,000 acres of land originally sold by the Government under the private-sale law.

It is reasonable to assume that a study of this matter throughout the timbered regions of the public-land States would reveal a large number of cases where lands were alienated in great blocks under this law and are now owned in great blocks by large timber holders.

ASSIGNABILITY OF MILITARY-BOUNTY LAND-WARRANTS.—Another opportunity for the land speculator was offered by the provision of the act of March 22, 1852, making military-bounty land-warrants assignable. Under various acts granting individual land bounties for military service there were issued warrants embracing over 61,000,000 acres[3] of land. Under the earlier acts the warrants were not assignable, but warrants for nearly 35,000,000 acres were issued after the act of 1852 providing for their assignability.

The military warrants were locatable on any public land which was subject to private cash entry. They were bought up by land speculators in large quantities and used instead of cash to purchase public land at private entry. In such cases land was patented to the assignee who presented the warrant. The fact that land could be bought at private sale for $1.25 per acre cash indicates that the speculators who bought up warrants to use in place of cash obtained them for less than that price.

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[1] The Public Domain, pp. 544–545. [2] Ibid., p. 545. [3] See Public Domain, pp. 233–237.

Section 13. Abuse of preemption, homestead, and timber and stone laws.

The general land laws already discussed, the cash-sale law, and the law making military warrants assignable, placed no limit on the amount of land any one person could acquire from the Government. The Federal preemption, homestead, and timber and stone laws, on the other hand, limited each individual to a 160-acre tract;[1] yet under cover of these laws great areas of timberland have passed from the possession of the Government in tracts of 160 acres each, only to fall almost directly into the hands of large timber owners.

It has been noted above that some of the State land laws limited the amount of State land that could be taken by any individual, without thereby securing any effective check against the speedy transfer of the individual's right in the land to some great timber holder, who practically used many such individuals to build up a great holding. The same has been true on a far larger scale of the Federal preemption, homestead, and timber and stone laws.

PREEMPTION AND HOMESTEAD LAWS.—The Public Land Commission (of 1879) in its preliminary report, February 24, 1880, said:

> Until the passage of the act of June 3, 1878, entitled "An Act for the sale of timberlands in the States of California, Oregon, Nevada, and in Washington Territory," there was no manner by which timber or timberlands in either of the States or the Territory mentioned could be obtained excepting by settlement under the homestead and preemption laws, and by the location of certain kinds of scrip and additional homestead rights, which cost several dollars per acre.
>
> Settlements upon timber-bearing lands in the States and Territory mentioned in the act, under the homestead and preemption laws, are usually a mere pretense for getting the timber. Compliance with those laws in good faith where settlements are made on lands bearing timber of commercial value is well-nigh impossible, as the lands in most cases possess no agricultural value, and hence a compliance with the law requiring cultivation is impracticable.
>
> The commission visited the redwood-producing portion of the State of California, and saw little huts or kennels built of "shakes" that were totally unfit for human habitation, and always had been, which were the sole improvements made under the homestead and preemption laws, and by means of which large areas of redwood forests, possessing great value, had been taken under pretenses of settlement and cultivation which were the purest fictions, never having any real existence in fact, but of which "due proof" had been made under the laws.[2]

Many official recommendations were made for the repeal of the preemption law, and in 1891 it was repealed. All its purposes were better fulfilled by the homestead law, and for years before its repeal it had been used as an easy means of transferring public lands to large speculators in agricultural and timberlands.

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[1] Preemption law, act of Sept. 4, 1841, and amendments (see The Public Domain, pp. 214–216); homestead law, act of May 20, 1862, and amendments (ibid., pp. 332–356); timber and stone law, act of June 3, 1878, and amendments (ibid., pp. 357–359). For later data, see Annual Reports of Commissioner of General Land Office.

[2] The Public Domain, p. 543.

THE COMMUTATION CLAUSE OF THE HOMESTEAD LAW.—Congress, in recognition of the fact that misfortune or change of circumstances might befall a settler, provided by a clause in the homestead act of 1862 that any claimant after 14 months' residence and cultivation might "commute" his entry; that is, purchase the land at $1.25 or $2.50 per acre at the end of the 14 months, instead of getting it free at the end of 5 years of residence and cultivation. There is no such thing as a separate and distinct law allowing the entry of agricultural land with *intent* to commute. The applicant for homestead land must swear, among other things, that he takes the land in "good faith for the purpose of making a home for himself" and not for speculation or sale. The commutation clause, however, allows him to buy the land after 14 months, if his original plans should change.

While the wording of the commutation clause required 14 months' residence and cultivation, the Interior Department until recently held that since homesteaders are given 6 months from the date of entry to establish themselves on the land, therefore 8 months' actual residence immediately following this 6 months was a sufficient compliance with that part of the law requiring 14 months' residence before commutation. This construction of the clause was given the force of actual law, as to former entries, by a recent Congress, but now the full 14 months is required in actual residence.

During the four years from July 1, 1899, to June 30, 1903, 1,485 homestead commutations were made in the timber belt of Minnesota alone, covering 192,189 acres, on which the timber was then estimated at 297,000,000 feet. The Government received $251,306.55, or 85 cents per thousand on the estimated amount of timber. A committee appointed by the Commissioner of the General Land Office estimated the value of the timber at that time at $3 a thousand, or $891,000, giving an immediate loss to the Government of $639,693.45, besides the value of the land itself.[1]

The following passage is from the report of this committee:

> The effect of the commutation clause of the homestead act within the State of Minnesota has been to place millions of feet of merchantable timber and hundreds of acres of prospective mineral lands in the hands of lumbering and mining corporations, with prospective profits of thousands of dollars to their present owners.
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> * * * * *
>
> The head of a large lumber company at Duluth, Minn., is authority for the statement, made in the presence of a member of your committee, that between the years 1885 and 1890 a certain lumber company of Minnesota and himself, together with others, obtained thousands of acres of pine lands from the

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[1] Report of Public Lands Commission, 1905, p. 67.

> Government under the old preemption law by simply filing names of persons found in the St. Paul (Minn.) and Chicago (Ill.) directories. When time for proof came, one set of men would appear at the local office and make proof on all claims set for that date. This gentleman also stated that he and the said lumber company had a standing agreement with the local land officers whereby they were to permit this kind of proofs for a consideration of $25 per claim. He denied that it was continued after the repeal of the old preemption law, but there is to be found strong evidence that this same system was continued as late as 1894 under the commutation clause of the homestead act.
>
> It is common knowledge in the city of Duluth, Minn., that in 1892, 1893, and 1894 persons desiring to commute would take an ordinary dry-goods box, make it resemble a small house with doors, windows, and a shingled roof. This box would be 14 by 16 inches, or larger, and would be taken by the entryman to his claim. On date of commutation proof he would appear at the local office, swear that he had upon his claim a good board house, 14 by 16, with shingled roof, doors, windows, etc. The proof on its face would appear excellent, and was readily passed by the local officers.[1]

In 1909, H. H. Schwartz, at that time chief of field service of the General Land Office, commented as follows on the commutation clause of the homestead law:[2]

> It has been my experience and observation in 10 years of field service that the commuted homestead is almost universally an entry initiated with a full intent never to make the land a home. Before the timber and stone law was extended to all public-land States the commutation clause in the homestead law was the vehicle through which timber was fraudulently acquired from the Government.
>
> It has been my personal experience to examine solid townships in northern Wisconsin, in which practically all the even-numbered sections had been acquired under the homestead law, quite generally commutation. The timber had been cut off after patent, and yet not a single voter or inhabitant could be found in the township. The Government got $400 a quarter section for lands frequently worth from $10,000 to $20,000. More recently actual farmers have purchased these stump lands from the mill companies.
>
> "Commutation" is the clause in the homestead law under which citizens who are not farmers or ranchers, and who have no intention of ever becoming such, enter agricultural or valuable timberlands.
>
> * * * * *
>
> Actual inspection of hundreds of commuted homesteads shows that not one in a hundred is ever occupied as a home after commutation. They become part of some large timber holding, or parcel of a cattle or sheep ranch.
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> * * * * *

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[1] Report of Public Lands Commission, 1905, pp. 72 and 73.

[2] Report of the National Conservation Commission (S. Doc. No. 676, 60th Cong., 2d sess.), Vol. III, p. 390.

Since the passage of the first commutation clause in the homestead law in 1862 there have been practically 35,000,000 acres of land acquired thereunder. The Government received probably $70,000,000 for lands worth over $350,000,000 at the time title left the United States.

The average yearly acreage commuted has been approximately 600,000. It is noted, however, that in the past few years the acreage of land annually commuted has largely increased. In 1905 there was a slight excess above 1,400,000 acres sold; in 1908 the acreage had increased to 3,124,277.

This increase coincides with the closer inspection and enforcement of the public-land law. Because of the inspection, those who are "dummies" for investors in timber, or cattle, or sheep concerns, and those who have no actual intent to make homes upon the land, are now unable to give such physical presence and cultivation to the land as will permit them to make a 5-year proof. As a consequence, they put in 8 months' time on the land, and thereupon commute. At present 14 months' actual residence is required.

On page 267, below, is shown the manner in which the United States parted with its title to some 34 of the most valuable sections of timberland in Pierce County, Wash. Twenty-three quarter sections were obtained by homestead entries. Each of these entries, if made in good faith, involved the establishment of a home; and a home could not be established without a clearing. The following table shows how many acres on each of these "homesteads" were reported by the assessor in 1910 as free from timber:

TABLE 59.—ACRES REPORTED BY THE ASSESSOR AS FREE FROM TIMBER, ON CERTAIN "HOMESTEADS" IN PIERCE COUNTY, WASH.

Part of section.	Section.	Township.	Range.	Acres free from timber.
NE. ¼	12	15	4	(1)
SE. ¼	12	15	4	(1)
W. ½ NW. ¼ and W. ½ SW. ¼	12	15	4	(1)
SE. ¼ NW. ¼ and E. ½ SW. ¼	12	15	4	(1) (2)
NE. ¼ NW. ¼	12	15	4	(2)
Lots 3 and 4 and S. ½ NW. ¼	4	15	5	0
SW. ¼	4	15	5	0
NE. ¼	22	16	5	0
NW. ¼	22	16	5	0
SE. ¼	22	16	5	0
SW. ¼	22	16	5	0
NE. ¼	32	16	5	0
SE. ¼	32	16	5	0
SW. ¼	32	16	5	0
NW. ¼	32	16	5	0
NE. ¼	16	17	5	0
NW. ¼	26	17	5	0
SE. ¼	26	17	5	0
NE. ¼	28	17	5	0
SE. ¼	28	17	5	0
SW. ¼	28	17	5	0
SE. ¼	30	17	5	0
NW. ¼	32	17	5	0
SE. ¼	32	17	5	0

[1] These four tracts, being three "homesteads" and three-fourths of another, are owned by one lumber company and are assessed together. The assessment shows 15 acres untimbered on the four tracts, but does not show on what tract the clear land is.

[2] These two tracts, of 120 acres and 40 acres, respectively, were obtained from the Government as one homestead. The 40-acre piece is assessed to an individual, and 18 acres of it are reported free from timber. The other 120 acres are owned by the same great timber company that owns the rest of the section.

On the 23 "homesteads," 3,676 acres, the whole amount of unforested land, whether naturally barren or cleared by man, is 33 acres. This clearing may be all on one claim, and, if not on one, is probably on two. Of the 23 "homesteads," at least 19, probably 21, and possibly 22, have no cleared land whatever.

THE TIMBER AND STONE ACT.—The act of June 3, 1878, entitled "An Act for the sale of timber lands in the States of California, Oregon, Nevada, and in Washington Territory," is commonly called the "timber and stone act." Later the act was extended to all the public-land States. It provided for the sale, at not less than $2.50 an acre, to citizens of the United States or persons who had declared their intention to become citizens, of all such land as was chiefly valuable for timber or stone. Not more than 160 acres was to be sold to one person but this interposed no serious obstacle to the acquisition of unlimited quantities through dummy entrymen.

The practical effect of the timber and stone act in aiding timber companies to assemble large holdings was early discovered, but it is still unrepealed. In 1883, five years after its passage, the Commissioner of the General Land Office vigorously denounced the law, and its repeal has been frequently urged in official reports of the Land Office, in the report of the Public Lands Commission in 1905, and in the report of the National Conservation Commission in 1909.

The law specifies that lands taken under it "may be sold * * * at the minimum price of $2.50 per acre." In administrative practice, until November 30, 1908, the *maximum* price asked was $2.50, as if the law had read "*shall* be sold." Since that date, by order of the Commissioner of the General Land Office, tracts taken have been appraised and the price fixed with reference to the amount and value of the timber and land, but at not less than $2.50 per acre. This is an improvement of administration, but it does not remedy the vital defects of the statute.

The criminal prosecution of timber frauds under this law, and of other public-land frauds as well, has been greatly hindered and in many cases prevented by the statute of limitations (U. S. Comp. Stat., ch. 19), which provides that a prosecution for criminal offenses against the United States (other than certain excepted crimes) is barred after a lapse of three years. As to recovery of the lands themselves, fraudulent entries may be canceled by the Interior Department at any time prior to patent. After patent has issued, any suit by the United States to annul or cancel it and recover the lands must be brought within six years of the date of the patent. (Act of Mar. 3, 1891, 26 Stat., 1099.)

On the evil effects of the timber and stone law in general it is sufficient to refer to five official reports: The first that of the Public Land Commission in 1880; the second that of the Commissioner of the

General Land Office in 1883; the third that of the same officer for 1886; the fourth that of the Public Land Commission in 1905; and the fifth that of the National Conservation Commission in 1909.

The first Public Land Commission as early as 1880 recommended a law for timberlands, which provided for retaining the fee ownership of natural forest land, selling the product on lease, and maintaining a perpetual supply. These recommendations of the commission were not enacted into law.

A report of the Commissioner of the General Land Office in 1883 clearly pointed out the abuses under the timber and stone act, in part as follows:

> The present and increasing value of timber is an inducement to individuals and companies to make large investments with a view to the control of the timber product, and the further enhancement of prices resulting from such control. The facility with which the restrictions of the public-land laws are evaded is a temptation to the illegal acquirement of title for the purpose of such investments.
>
> It would perhaps be of little moment how soon the public title to lands should pass to private holders, since that is the ultimate purpose of the laws, if the further purpose of the laws that public lands should in the original instance be widely distributed among the people could also be secured. But if this can not be done, and the systems of public disposal are to result, as they now do, in permitting capitalists to indirectly obtain great bodies of public land, it is certainly but provident for the United States to require a price to be paid for its timberlands somewhat commensurate to their value.
>
> Several propositions have been presented in Congress looking to a change in the methods of disposing of lands valuable chiefly for timber. The subject is one of difficulty, and it is important that the wisest action be taken. I am of opinion that such lands should be reserved by law from ordinary disposal, and sold only after appraisement and upon sealed bids, at not less than the appraised price. It would be proper that an act to such effect should not deprive settlers on the public lands of the right to take timber for domestic purposes or the support of their improvements.[1]

Again in his annual report for 1886 the Commissioner of the General Land Office gave numerous specific instances of violations of the timber and stone law.[2]

The Public Lands Commission of 1903 in its second partial report of February 13, 1905, in speaking of the frauds under this law pointed out that in many cases transfers of the land were made to lumber companies immediately, often on the same day as the title was received; that the original entrymen rarely realized more than ordinary wages for the time spent in making the entry and completing the transfer; that the corporations which ultimately secured the land usually absorbed by far the greater part of the profit; and that the timber was withdrawn from use till the corporations that owned it saw fit to cut.[1]

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[1] Quoted in The Public Domain, pp. 1165-1166.

[2] H. Ex. Doc., No. 1, Pt. 5, pp. 93-95, 49th Cong., 2d sess., vol. 9.

The commission urged the repeal of the timber and stone act, and in its place recommended the sale of timber (without the land) on the remaining unreserved public domain, as follows:

> We recommend the enactment of a law under which it shall be lawful for the Secretary of the Interior to sell to the highest bidder, at public outcry or otherwise, under such rules and regulations and subject to such conditions and restrictions and in such quantities as he may prescribe, the right to cut and remove, within such period of time as he may fix, any timber from any unappropriated, nonmineral, surveyed public lands, after first having had such timber duly appraised, and after giving public notice of the time, terms, manner, and place of such sale; that he shall have power and authority to reject any and all bids offered at any such sale, and that it shall be unlawful for any purchaser at such sale to sell, transfer, assign, or in any manner alienate the rights secured by him under this act, except as authorized by said Secretary; * * * and that no lands valuable chiefly for timber shall hereafter be patented under the commutation provisions of the homestead laws; that any person who violates any of these provisions, or any regulation or requirement prescribed pursuant thereto, shall forfeit to the United States all benefits conferred, and all moneys paid by him, and that any right to cut and remove timber which he may then hold shall be canceled and revoked.[2]

The commission also urged the classification of lands. Its recommendations quoted above have not been enacted into law.

A further statement as to the results of the timber and stone act was made in 1909 in connection with the report of the National Conservation Commission, by Mr. H. H. Schwartz, whose statement on the commutation clause of the homestead act has already been given. Mr. Schwartz said in part:[3]

> In practice * * * this law has resulted in the sale of over 12,000,000 acres of valuable timberlands, of which fully 10,000,000 acres were transferred to corporate or individual timberland investors by the entrymen. These lands brought to the people or General Government a gross sum of $30,000,000. At the date of sale they were reasonably worth $240,000,000. The profit of over $200,000,000 went not to the needy settler engaged in subduing the wilderness, but to the wealthy investors. Not over a fractional part of 1 per cent of the timber purchased from the United States under this act is held, consumed, or even cut by the men and women who made the entries.

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[1] Report of the Public Lands Commission of 1903, p. xvi.

[2] Ibid., pp. vii, viii.

[3] Report of the National Conservation Commission, Vol. III, pp. 387-389.

The law requires, and each applicant makes, an oath containing among other things the following:

"That he does not apply to purchase the same on speculation, but in good faith to appropriate it to his own use and benefit; and that he has not directly or indirectly made any agreement or contract in any way or manner, with any person or persons whatever, by which the title he might acquire from the Government of the United States should inure, in whole or part, to the benefit of any person except himself."

The Supreme Court, in United States *v.* Budd (144 U. S., 154), holds that an entry and purchase made with intent to sell at an advance if the market improves, and with no intent to use the timber itself, is not a "purchase for speculation."[1]

* * * * *

With enough entrymen possessed of $500 each, or credit to borrow that amount, and a prospective buyer at a small advance, the machinery is complete for transferring title from the Government, or general public, to the single corporate or individual investor. The process has been automatic, and in most cases neither fraud, perjury, or false swearing is needed.

* * * * *

Since January 6, 1908, the person entering timberlands, where some investor has given his notice of a willingness to buy all lands entered, need not even have the $500 with which to buy, nor need he have credit upon which he may borrow that amount. The Supreme Court of the United States, in the case of United States *v.* Williamson (207 U. S., 425), decided upon the above date, holds that an entryman who has filed his sworn statement designating the particular tract he desires to purchase may, between the date of so filing and the date of actual payment—the 60 or 90 days during which he advertises his application to purchase—lawfully contract to sell or convey the land after patent issues. In other words, he may enter the lands with an intent to sell at once if he can make a profit; the corporate or individual investor may inform him that he will buy at a profit; after the entry is made, and before the applicant advances a dollar of the purchase price, entryman and prospective purchaser may contract to convey and the investor bind the bargain by depositing with entryman's attorney enough of the sale price to pay the Government for the land, and the identical money advanced on the lawful contract to sell is paid over the counter of the land office by entryman's attorney at final proof.

There is no fraud in the entryman; no risk to the investor; and a single concern may secure a wood lot of 100,000 acres in less than a year, at a profit of $1,000,000 to the corporation and at a loss of the same sum to the general public, which is the Government.

I recall a specific instance in the Susanville and Redding districts, California, where a single investor, in the course of probably three years, acquired approximately 700,000 acres of heavily timbered lands, a large amount of which was secured under the timber and stone act.

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[1] *Note by Bureau:* Cf. also Olson *v.* United States (133 Fed., 849, 852, 853), where the Circuit Court of Appeals interprets the holding in the Budd case, and the meaning of the statute.

> In another large operation in central Oregon trainloads of women school-teachers were shipped out from Minnesota and entered lands under the timber and stone act. A hundred citizens of Oregon made like entries. These lands were then transferred to a timber investor from Minneapolis, Minn., transfers going to him by deeds to a corporation. The articles of this incorporation were peculiar. They provided that only the president need own stock therein. Its officers were composed of the president (who was the investor) and his wife and son, who were, respectively, secretary and treasurer.
>
> During the past 10 years there have been like individual operations in Montana, Idaho, Washington, and Colorado.

An excellent illustration, not only of the actual working of the homestead and the timber and stone laws, but also of the danger involved in making eliminations from the national forests, is found in the Olympic Peninsula of Washington. Over 400,000 acres (net area) was eliminated from the Olympic National Forest in 1900 and 1901 on the ground that the land was chiefly valuable for agriculture, and that the settlement of the country was being retarded. The land thus eliminated for *agricultural* use was largely taken up under the timber and stone law, which requires oath that the land is "*valuable chiefly for timber, but not fit for cultivation.*" It is now (10 years later) held mostly by great timber holders in private instead of public reserves. Only 100 settlers are living in the area eliminated, and the total amount of land they have in cultivation is only 570 acres, an average of less than 6 acres to the settler. Thus, the alleged purpose of the elimination was defeated and bona fide settlement was not advanced. The brief mention here made is to be supplemented by a full discussion, with maps, in a later part of this report.

Section 14. Prodigality of the public-land policy.

The fact that the land policy of the past 60 years has resulted in transferring great tracts of timberland from the public to a limited number of individuals becomes more significant when the values involved are considered. Two concrete examples of the prodigality of the policy are here given, in addition to those cited in Chapter V above.

The Bureau selected some 34 sections of the best timberland in Pierce County, Wash., and then traced the manner in which these sections were originally alienated by the United States and the amount received by it for them. The sections were chosen for their relatively high assessed valuation, ranging from $25,000 to $52,000 per section of 640 acres. They are not intended to be regarded as average or as typical, though it is believed that there are many other equally striking instances. The exact area of the timberland selected for this study was 21,602 acres. The total assessed valuation of the timber (exclusive of the land) in 1910 was $1,132,389. It is probable that the cash value of the timber on the individual sections would range from about $50,000 to about $125,000, and that the cash value of the whole is from $2,250,000 to $2,750,000.[1]

Except for the land in the Northern Pacific grant and the school sections the earliest date of initiation of any right to these lands was 1889, only 22 years ago, and (with the exception of school sections which passed to the State without patent) all of it, including the railroad land, has been patented within the last 18 years. Nearly all was alienated without cash recompense, and in no case for a greater consideration than $2.50 an acre. For the 5,082 acres not included in the Northern Pacific grant and the State grants the Government received less than $5,000.

Nearly all the tracts shown in the table have passed into the hands of great corporations. Thus, 12,023 acres, with an assessed valuation of $653,289 and a probable cash value of about $1,200,000 or $1,500,000, is assessed to the Weyerhaeuser Timber Company, and 6,080 acres, with an assessed value of $308,260 and a probable cash value of from $600,000 to $750,000, is assessed to the St. Paul and Tacoma Lumber Company. A table showing detail of the facts here summarized will be found on page 281.

In 1909 an estimate of the present value of certain lands included in court cases, or before the Interior Department, on charges of illegality or fraudulent acquisition from the public domain, was officially submitted to Congress in connection with the request of the General Land Office for the special appropriation of $1,000,000 which was made to investigate and prosecute the cases. This estimate showed a total valuation of $114,733,273, for the lands involved in the cases listed. The statement does not in all cases show the acreage involved, but, taking this where it is shown, it is found that the estimated value of 556,861 acres of land claimed or secured under the settlement or timber and stone laws, as placer locations, or under the land grants, is no less than $32,581,400. This is an average of over $58 per acre, whereas for some of this land the Government received no cash payment and for none of it more than $2.50 an acre. The 556,861 acres includes, however, 300 acres of mineral lands alleged to have been erroneously acquired under the Union Pacific grant (which excluded minerals). The estimated value of the 300 acres is $15,000,000, or $50,000 an acre. It also includes 161,600 acres of coal lands taken under timber, or under nonmineral forms, of entry, valued at $9,360,000, an average of $58 an acre, or over 23 times the highest price received by the Government for any of it. Of timberlands proper, it includes 288,201 acres, with a valuation of $7,135,800, equivalent to $25 per acre, or 10 times the highest price received by the Government. In point of size, the main item of this 288,201 acres is a holding of 200,000 acres of timberland within the boundaries of the forest reserve taken up as placer locations, the Government price of which is $2.50 per acre. This is valued at $5,000,000, or $25 per acre.

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[1] The Pierce County authorities have made a "cruise," or estimate of quantity, of the timber on each tract in the county. They reached the assessed value of the timber on each tract by multiplying the estimated number of thousands of feet by the assessed value per thousand.

A careful study of the Pierce County cruise, in the light of reports made to the Bureau by many large owners of timber in the county, indicates that, in general, the amounts fixed on by the county do not exceed two-thirds of the actual amounts of timber. The assessment is professedly intended to be about 60 per cent of the actual cash value of the quantity of timber which the cruise shows. If this quantity is two-thirds of the true amount, and if the assessed value is 60 per cent of the actual cash value of such a quantity, the assessed value is 40 per cent of the true value of the timber actually present. On this basis it would appear that the assessed valuations of timber should be multiplied by 2½ to give approximately the true value.

The Washington State Board of Tax Commissioners placed the actual value of all the timberlands in Pierce County in 1908 at $18,868,004. The assessed value of such lands for 1910 was $7,802,600, or 41.4 per cent of the actual value as estimated two years before. (See Second Biennial Report of State Board of Tax Commissioners, Appendix B, p. 95; Third Biennial Report of State Board of Tax Commissioners, Appendix B, p. 90.)

Besides the 556,861 acres referred to, the statement shows 84,262 acres of mineral and coal land entries, other than placer locations, alleged to be fraudulent, with an estimated present value of $15,355,840. Of this, 78,000 acres is coal land, valued at over $15,000,000, an average of $193 per acre, as against the regular Government price of $10 or $20. A single case involved 40,000 acres of coal land, valued at $200 an acre, or $8,000,000. One item of the statement which specifies no acreage covers four suits involving mineral lands acquired under railroad grants which excluded minerals. The value of the lands comprised in the four suits is placed at over $25,000,000.

This estimate of the values involved in land cases pending in 1909 (irrespective of whether in the final outcome the Government or the private claimant obtains the land) strikingly illustrates how the Government's land policy with reference to timberlands—as distinct from agricultural lands—as it has actually worked out in practice, has disposed of immense public wealth in timber, and other resources, without securing any adequate return therefor in money or social advantage. Furthermore, this wealth, instead of having been distributed among a vast number of independent owners, as contemplated by the original spirit of this policy, has actually been concentrated to a very marked degree in a comparatively few hands.

Section 15. Summary and conclusions.

In this chapter there has been an attempt to set forth some of the principal features of the public-land policy which have contributed to the present concentration of timber ownership. There have been traced partially here and there the effects of Federal laws disposing of the public domain, such as the great land grants, cash sales, and the homestead and the timber and stone laws. Much of the legislation in question, including the land grants, was expected to bring about ultimately a distribution of public lands in comparatively small tracts. As a matter of fact, so far at least as the timber regions are concerned, most of it has signally failed in this respect. Instead, the facts presented in this report show that timberlands alienated in immense grants have largely been retained by the original grantees or transferred in great blocks; and even where alienated in small tracts under the general land laws, such lands have largely been gathered into great holdings by timber speculators.

Altogether, it is clear that there has been a lavish dissipation of standing timber and other natural resources of the national domain, and that the beneficiaries of this policy have too frequently been not actual settlers, but capitalists who have been able to take advantage of this legislation or its faulty administration, and thus to accumulate vast holdings of timberland at a comparatively small cost and reap therefrom an enormous profit.

A striking fact is that the operation of much of this legislation was early understood and condemned by careful observers. That such warnings as those of public-land commissions and other public officers were so long disregarded is partly explained, no doubt, by the counter-pressure of local self-interest and the persistent efforts of beneficiaries of such legislation. However, it was also due in some part to the easy-going attitude of the public itself, which at that time looked upon these resources as practically inexhaustible. This attitude of the public was also to some extent attributable to the specious character of some of this legislation, especially the apparent limitation of the amount of land available to a single individual, which seemed to assure a wide distribution of ownership.

The development of public opinion affecting the country's natural resources has been very slow, and it must be remembered that in judging the public-land policy of a generation ago allowance must be made for conditions then existing. It would seem, however, that the public mind has at last been awakened to a realization of the fact that the present supply of standing timber is not inexhaustible. The creation of national forests, which reserved from private acquisition a large part of the timbered areas still remaining in public ownership, definitely marked a fundamental change in policy, and this is also indicated by the progress in recent years toward scientific and accurate classification of the remaining resources of the public domain. However, there is now a disposition to secure the alienation of timberland from national forests under the subterfuge of settlement. The experience of the past, as set forth in this report, may therefore be pertinently emphasized at this time.

It is also desirable to call attention to the fundamental difference between the sale of agricultural lands to actual settlers, who by their industry improve this land and thereby contribute to the development of the community, and the alienation of timberlands, which do not require improvement and the value of which tends almost certainly to rise because of reduction in the supply and increase in population. The mere acquisition of timberlands from the public domain and their speculative holding involve only a negligible service to the public, while the concentration of the ownership of such lands, as set forth in this report, constitutes a serious public danger.

While much of the public domain has been dissipated in the manner indicated, it may be repeated, as already shown, that the Government is still the largest single owner of standing timber. While much of its timber is of relatively low value, nevertheless, in view of the fact that the Government is in an especially advantageous position for the practice of reforestation on an extensive scale, it seems that it should be able at a later date to materially strengthen its relative position as a timber owner. A further addition to its holdings may, moreover, be brought about as a result of forfeiture suits, some of which are now in progress. The facts set forth in this report clearly point to the desirability of maintaining the integrity of the national forests and, furthermore, suggest the desirability of the extension of the essential principles of the national-forest policy to such publicly owned timber as now stands on lands outside of these reserves, including forests of Alaska, possibly by bringing such lands within national-forest limits. It would seem that the same principles should also be extended to lands recovered by the Government in suits for forfeiture of title. This, however, affords only a partial solution of the grave problems involved in the concentration of the privately owned timber of the country.

SCHEDULE ON STANDING TIMBER
AND
ADDITIONAL TABLES.

SCHEDULE ON STANDING TIMBER.

Department of Commerce and Labor, Bureau of Corporations.

SCHEDULE ON STANDING TIMBER.

[Return to Commissioner of Corporations, Department of Commerce and Labor, Washington, D. C. If more space is required, other sheets may be attached. Additional copies of pages 4 and 5 will be furnished on request.]

-----------------------, --------------, *19*..
(Place.) (Date.)

1. Name and address of person furnishing information given in this schedule: --
----

If an officer or employee of the owner, give position: ----------

2. Name of owner of standing timber: ----------------------
Principal office at -------------------------------------
Other offices at ---------------------------------------

3. *If owner is a corporation,* State of incorporation: ------------; date of incorporation, ----------------------------; capital stock authorized, $--------------------; issued, $-----------------
President, ---------------------; address, -----------------
Vice president, ----------------; " -------------------
Secretary, ---------------------; " -------------------
Treasurer, ---------------------; " -------------------

4. *If owner is a partnership,* full name and address and amount of interest of each partner: ----------------------------------
----

5. Names of lumber associations or other trade organizations connected with the lumber industry of which this owner or any of its officers or employees is a member: ---------------------------

6. *Business of owner:*

(a) Are timber lands held for supply to sawmill or as an investment? --
(b) Sawmills at ---
(c) Wholesale or distributing yards at ---------------------
(d) Retail yards at ---
(e) If any properties of this owner (connected with the lumber industry) are operated under a name other than that shown for question 2, give name, location, and business of such establishments:
----

7. *Connection between this owner and other lumber interests.* (If the owner is an individual or a partnership, give the other timber or lumber interests of such individual or the several partners under the second part of "a"):

(a) Names and addresses of the individuals who hold the controlling stock interest in this company, and amount of stock held by each: --

What other timber or lumber interests have these individuals (personal holdings or interests in other concerns owning timber, or manufacturing or marketing lumber)?------------------------

(b) If other companies or partnerships have a stock interest in this company, give name, principal office, and business of each such company or partnership and amount of said interest: ------------ --

(c) If this company has a stock interest in other companies, give name, principal office, and business of each such company, the amount of its stock or bonds, and amount held by this company: --------- --

(d) Is this owner a part owner of any timberland or timber rights not shown in this schedule?------------- If so, fill out another schedule for the land or timber rights so owned, or name the person from whom the information may be obtained:----------------------

8. *Estimates of timber:* (When the estimates on separate tracts have been made at different times, or by different methods, the following blanks will not be sufficient. In such cases please write out a full statement covering the several points for each estimate and attach it to the schedule.)

(a) How was the estimate made (give such brief description of the method used as will indicate the accuracy of the work, for example, whether by mensuration over typical areas, or on the judgment of estimator after detailed examination of tract, or after general observation only)?-- --

(b) When was estimate made?--------------- (c) How much should this estimate be increased to cover changes in standards of merchantable timber since it was made?--------------- per cent. (This per cent is included in the per cent of overrun called for in "g.") (d) Diameter at stump of smallest trees considered in making estimate?------------ inches. Height of stump? ------------ inches. Diameter at stump of smallest trees that would now be taken? ------------ inches. Height of stump? ------------ inches.

(e) Was the estimate intended to be the best possible approximation to the actual mill output, or was it based on a log rule?------

(f) Log rule used: --------------------------------------

(g) The mill output will probably be ------------ per cent more than this estimate.

(h) If timber of any kind was neglected in making the estimates, state the kinds, and the nearest approximation to the amount of each that can be made: ------------------------------------

9. *Location of land and estimate of timber:* On the following page give the totals for all lands and timber rights owned and also estimates for each part thereof that has been separately estimated. If the estimates were made in greater detail than can be shown on page 4—as by survey sections or forties—a copy of the full record should be attached to the schedule.. The exact location of the lands should be shown by a copy or blue print of the owner's plat, or if the land is in the States covered by the rectangular survey the location may be shown on pages 5, 6, and 7,[1] on which the forties may be marked as follows: Timberland ☒. Timber rights ⧇. Young timber ☑. Denuded land ⊡.

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[1] The diagram plats referred to are not reproduced here.

[illegible] OF INDIVIDU[illegible]
[illegible] E COUNTY, WASH., FOR THE YEAR 1910, WITH THE
[illegible] AND [illegible] BY THE UNITED STATES.

Part of section.	Section.	Township (north).	Range (east).	Number of acres.	Manner of alienation.	Patented.	Settled.	Assessment for 1910.		Assessed to—
								Timbered acreage.	Value of timber, exclusive of land.	
All	1	15	4	636	Northern Pacific Railroad grant	Apr., 1901		616	$34,334	Weyerhaeuser Timber Co.
NE. ¼	12	15	4	160	Homestead	Nov., 1899	Nov., 1890	585	29,490	Do.
SE. ¼	12	15	4	160	do	Oct., 1899	Sept., 1891			
W. ½ NW. ¼ and W. ½ SW. ¼	12	15	4	160	do	Dec., 1900	July, 1891			
SE. ¼ NW. ¼ and E. ½ SW. ¼	12	15	4	120	do	do	Apr., 1893			
NE. ¼ NW. ¼	12	15	4	40	do	do	do	22	1,510	R. Vincent.
All	1	16	4	676	Northern Pacific Railroad grant	Mar., 1896		[1] 677	29,920	Wheeler-Reese Lumber Co.
Lots 3 and 4 and S. ½ NW. ¼	4	15	5	156	Homestead	Oct., 1895	Sept., 1889	474	19,345	Weyerhaeuser Timber Co.
Lots 1 and 2 and S. ½ NE. ¼	4	15	5	159	State selection [2]	Mar., 1899				
SE. ¼	4	15	5	160	Timber and stone	May, 1900				
SW. ¼	4	15	5	160	Homestead	Oct., 1898	July, 1891	160	6,745	Washington Fir and Timber Co.
NE. ¼	8	15	5	160	Timber and stone	July, 1893		400	24,215	Weyerhaeuser Timber Co.
E. ½ NW. ¼ and E. ½ SW. ¼	8	15	5	160	do	do				
W. ½ NW. ¼	8	15	5	80	do	do				
W. ½ SW. ¼	8	15	5	80	do	do		80	5,100	A. Elsner.
All	9	15	5	640	Northern Pacific Railroad grant	Dec., 1894		640	29,640	Weyerhaeuser Timber Co.
All	16	15	5	640	School land			640	52,200	Do.
All	17	15	5	640	Northern Pacific Railroad grant	Dec., 1894		640	46,950	Do.
All	21	15	5	640	do	do		589	40,675	Do.
S. ½	24	15	5	320	State selection	Nov. 1896		320	19,415	Do.
All	23	15	5	640	Northern Pacific Railroad grant	Dec., 1894		640	40,475	Do.
All	3	16	5	686	do	Oct., 1895		686	39,350	Do.
All	5	16	5	686	do	do		686	29,645	Do.
All	7	16	5	633	do	do		633	33,700	Do.
All	15	16	5	640	do	do		640	26,455	Do.
N. ½ and SW. ¼	16	16	5	480	School land			480	28,000	Do.
All	19	16	5	636	Northern Pacific Railroad grant	Oct., 1895		636	30,515	Do.
NE. ¼	22	16	5	160	Homestead	May, 1898	Oct., 1891	640	25,635	Do.
NW. ¼	22	16	5	160	do	Aug., 1901	Oct., 1895			
SE. ¼	22	16	5	160	do	Oct., 1898 [3]	Sept., 1895			
SW. ¼	22	16	5	160	do	Aug., 1898	Mar., 1891			
All	29	16	5	640	Northern Pacific Railroad grant	Oct., 1895		640	34,475	Do.
All	31	16	5	638	do	do		638	31,225	Do.

[1] Land-office records show 676 acres in section.

[2] For charitable, educational, penal, and reformatory institutions.

[3] Credited with military service two years.

TABLE III.—ASSESSED VALUE OF THE TIMBER ON CERTAIN SELECTED SECTIONS IN PIERCE COUNTY, WASH., FOR THE YEAR 1910, WITH THE MANNER AND DATES OF ALIENATION BY THE UNITED STATES—Continued.

Part of section.	Section.	Township (north).	Range (east).	Number of acres.	Manner of alienation.	Patented.	Settled.	Assessment for 1910.		Assessed to—
								Timbered acreage.	Value of timber, exclusive of land.	
NE. ¼	32	16	5	160	Homestead	May, 1896	Oct., 1890	480	$28,700	Salling and Wheeler.
SE. ¼	32	16	5	160	do	do	do			
SW. ¼	32	16	5	160	do	May, 1898	June, 1891			
NW. ¼	32	16	5	160	do	Oct., 1896	Apr., 1891	160	8,590	Weyerhaeuser Timber Co.
All	9	17	5	640	Northern Pacific Railroad grant	Apr., 1895		640	30,230	St. Paul and Tacoma Lumber Co.
All	15	17	5	640	do	do		640	28,415	Do.
NE. ¼	16	17	5	160	Homestead	Oct., 1895	Jan., 1889	320	13,635	Do.
SW. ¼	16	17	5	160	School land					
All	17	17	5	640	Northern Pacific Railroad grant	Apr., 1895		640	26,430	Do.
All	21	17	5	640	do	Dec., 1894		640	27,265	Do.
All	23	17	5	640	do	do		640	37,310	Do.
NE. ¼	26	17	5	160	Preemption	Apr., 1893		640	32,300	Dempsey Lumber Co.
NW. ¼	26	17	5	160	Homestead	July, 1893	Apr., 1889			
SE. ¼	26	17	5	160	do	do.[1]	July, 1889			
SW. ¼	26	17	5	160	Preemption	Apr., 1893				
All	27	17	5	640	Northern Pacific Railroad grant	Dec., 1894		640	37,625	St. Paul and Tacoma Lumber Co.
NE. ¼	28	17	5	160	Homestead	Dec., 1896	Jan., 1890	160	12,220	Do.
E. ½ NW. ¼	28	17	5	80	Preemption	June, 1895		480	28,150	Do.
W. ½ NW. ¼	28	17	5	80	Surveyor's scrip					
SE. ¼	28	17	5	160	Homestead	July, 1896	July, 1889			
SW. ¼	28	17	5	160	do	Mar., 1896	do			
All	29	17	5	640	Northern Pacific Railroad grant	Dec., 1894		640	36,345	Do.
NE. ¼	30	17	5	160	Preemption	June, 1893		320	13,795	Dempsey Lumber Co.
SE. ¼	30	17	5	160	Homestead	Nov., 1898	July, 1889			
NE. ¼	32	17	5	160	Preemption	Apr., 1893		480	19,500	Do.
NW. ¼	32	17	5	160	Homestead	Mar., 1895	Fall, 1889			
SE. ¼	32	17	5	160	do	Mar., 1897	Nov., 1891			
All	33	17	5	640	Northern Pacific Railroad grant	Dec., 1894		640	30,635	St. Paul and Tacoma Lumber Co.
All	21	15	6	640	do	do		640	33,270	Northwestern Improvement Co.
All	9	19	8	640	do	Apr., 1901		640	28,960	Weyerhaeuser Timber Co.

[1] Credited with military service, two years.

NOTE.—The following tables (IV to IX) were compiled for the Forest Service at its request:

TABLE IV.—STANDING TIMBER, BY SPECIES, IN LOUISIANA, BY DIVISIONS BASED ON THE AREAS OF YELLOW PINE.

[In billions of board feet. Thus, 119.8=119,800,000,000 board feet.]

Species.	Louisiana.	East of the Mississippi River.[1]	North of the Red River.[2]	Other parishes.
Total	119.8	15.9	36.4	67.5
Yellow pine	67.7	11.5	17.6	38.6
Longleaf	52.5	10.9	7.5	34.1
Shortleaf and loblolly	15.2	.6	10.1	4.5
Cypress	15.7	1.3	1.0	13.4
Hardwoods	36.4	3.1	17.8	15.5

[1] Except the parishes south of the north boundary of Ascension, which contain no yellow pine.
[2] Includes all of Red River Parish and excludes all of Natchitoches, Rapides, and Avoyelles Parishes.

The parishes in each division are as follows: *East of the Mississippi River*—East Baton Rouge, East Feliciana, Livingston, St. Helena, St. Tammany, Tangipahoa, Washington, West Feliciana. *North of the Red River*—Bienville, Bossier, Caldwell, Claiborne, Concordia, Catahoula, East Carroll, Franklin, Grant, Jackson, La Salle, Lincoln, Madison, Morehouse, Ouachita, Red River, Richland, Tensas, Union, Webster, West Carroll, Winn. *Other parishes*—Acadia, Ascension, Assumption, Avoyelles, Caddo, Calcasieu, Cameron, De Soto, Iberia, Iberville, Jefferson, Lafayette, Lafourche, Natchitoches, Orleans, Plaquemines, Pointe Coupee, Rapides, Sabine, St. Bernard, St. Charles, St James, St. John the Baptist, St. Landry, St. Martin, St. Mary, Terrebonne, Vernon, Vermilion, West Baton Rouge.

TABLE V.—CYPRESS AND HARDWOODS IN LOUISIANA, BY DIVISIONS, BASED ON THE ALLUVIAL REGIONS.

[In billions of board feet. Thus, 15.7=15,700,000,000 board feet.]

Species.	Louisiana.	North Mississippi River parishes.	South Mississippi River parishes.	Red, Sabine, and Pearl River parishes.	Other parishes.
Cypress	15.7	0.6	14.3	0.7	0.1
Hardwoods	36.4	13.8	9.5	10.9	2.2

The parishes in each division are as follows: *North Mississippi River parishes*—Caldwell, Catahoula, Concordia, East Carroll, Franklin, La Salle, Madison, Morehouse, Ouachita, Richland, Tensas, Union, West Carroll. *South Mississippi River parishes*—Ascension, Assumption, Avoyelles, East Baton Rouge, Iberia, Iberville, Jefferson, Lafourche, Livingston, Orleans, Plaquemines, Pointe Coupee, St. Bernard, St. Charles, St. James, St. John the Baptist, St. Landry, St. Martin, St. Mary, Tangipahoa, Terrebonne, West Baton Rouge, West Feliciana. *Red, Sabine, and Pearl River parishes*—Bossier, Caddo, Calcasieu, Cameron, De Soto, Grant, Natchitoches, Rapides, Red River, Sabine, St. Tammany, Vernon, Washington, Winn. *Other parishes*—Acadia, Bienville, Claiborne, East Feliciana, Jackson, Lafayette, Lincoln, St. Helena, Vermilion, Webster.

TABLE VI.—STANDING TIMBER IN MISSISSIPPI, BY SPECIES AND BY GROUPS OF COUNTIES.

[In billions of board feet. Thus, 95.3=95,300,000,000 board feet.]

Group of counties.	Total timber.	Yellow pine.		Hardwoods and cypress.
		Longleaf.	Shortleaf and loblolly.	
Mississippi	95.3	47.6	14.8	32.9
Group 1	3.4	.4	.8	2.2
Group 2	8.6	6.9	.3	1.4
Group 3	15.6	14.4	....	1.2
Group 4	21.0	19.3	....	1.7
Group 5	14.3	6.6	5.0	2.7
Group 6	6.9	....	4.1	2.8
Group 7	4.2	....	2.3	1.9
Group 8	4.8	....	1.7	3.1
Group 9	1.2	....	.2	1.0
Group 10	2.2	....	.3	1.9
Group 11	13.1	....	.1	13.0

The stand of cypress in the State is 1.9 billion feet. Of this, 1 billion is in Sharkey, Washington, and Issaquena counties; outside these counties the most important stand is in Wilkinson, and the next in Greene.

The counties in each group are as follows:

Group 1. Warren, Claiborne, Jefferson, Adams, and Wilkinson.

Group 2. Copiah, Lawrence, Lincoln, Franklin, Amite, and Pike.

Group 3. Simpson, Smith, Covington, Jefferson Davis, Marion, Jones, and Lamar.

Group 4. Forrest, Perry, Greene, George, Jackson, Harrison, Pearl River, and Hancock.

Group 5. Kemper, Lauderdale, Newton, Scott, Rankin, Hinds, Jasper, Clarke, and Wayne.

Group 6. Noxubee, Winston, Attala, Madison, Leake, and Neshoba.

Group 7. Lowndes, Monroe, Itawamba, Tishomingo, Prentiss, and Alcorn.

Group 8. Pontotoc, Lafayette, Calhoun, Chickasaw, Clay, Webster, Choctaw, and Oktibbeha.

Group 9. Lee, Union, Tippah, Benton, and Marshall.

Group 10. De Soto, Tate, Panola, Yalobusha, Tallahatchie (hill section), Grenada, Montgomery, Carroll, Holmes (hill section), and Yazoo (hill section).

Group 11. Tunica, Coahoma, Quitman, Bolivar, Sunflower, Tallahatchie (delta section), Leflore, Holmes (delta section), Yazoo (delta section), Washington, Sharkey, Issaquena.

TABLE VII.—STANDING TIMBER IN ALABAMA, BY SPECIES AND BY GROUPS OF COUNTIES.

[In billions of board feet. Thus, 56.3=56,300,000,000 board feet.]

Group of counties.	Total timber.	Yellow pine.		Hardwoods and cypress.[1]
		Longleaf.	Shortleaf and loblolly.	
Alabama	56.3	25.6	12.4	18.3
Group 1	10.0	8.2	.3	1.5
Group 2	9.3	6.7	.6	2.0
Group 3	9.5	.4	4.8	4.3
Group 4	1.8	.3	.9	.6
Group 5	2.5	.9	.6	1.0
Group 6	7.3	3.1	2.0	2.2
Group 7	5.4	4.2	.6	.6
Group 8	2.1	.8	.6	.7
Group 9	7.4	1.0	2.0	4.4
Group 10	1.0	....	....	1.0

[1] The stand of cypress in the State is 200 million feet.

The counties in each group are as follows:

Group 1. Washington, Mobile, Baldwin, Escambia, Covington, Geneva, and Houston.

Group 2. Choctaw, Clarke, Monroe, Conecuh, Butler, and Crenshaw.

Group 3. Marengo, Sumter, Greene, Pickens, Lamar, Marion, Franklin, and Colbert.

Group 4. Wilcox, Dallas, Lowndes, Montgomery, Macon, and Bullock.

Group 5. Pike, Coffee, Dale, Henry, Barbour, Russell, Lee, and Chambers.

Group 6. Tuscaloosa, Hale, Perry, Bibb, Chilton, and Autauga.

Group 7. Elmore, Coosa, Tallapoosa, Randolph, Clay, Talladega, and Cleburne.

Group 8. Shelby, St. Clair, Calhoun, Etowah, and Cherokee.

Group 9. Fayette, Walker, Jefferson, Blount, Cullman, Winston, Lawrence, Morgan, Marshall, Dekalb, and Jackson.

Group 10. Madison, Limestone, and Lauderdale.

TABLE VIII.—STANDING TIMBER IN MINNESOTA, BY SPECIES AND BY GROUPS OF COUNTIES.

[In billions of board feet. Thus, 23.2=23,200,000,000 board feet.]

Group of counties.	Total timber.	White and Norway pine.	Other conifers.	Hardwoods.
Minnesota	23.2	12.5	6.3	4.4
Group 1	13.3	7.7	4.2	1.4
Group 2	6.8	3.5	1.7	1.6
Group 3	2.2	.8	.3	1.1
Group 4	.9	.5	.1	.3

The counties in each group are as follows:

Group 1. Cook, Lake, and St. Louis.

Group 2. Koochiching, Itasca, and Beltrami.

Group 3. Aitkin, Cass, Hubbard, and Clearwater.

Group 4. The rest of the State.

TABLE IX.—STANDING TIMBER IN WISCONSIN, BY SPECIES AND BY GROUPS OF COUNTIES.

[In billions of board feet. Thus, 29.2=29,200,000,000 board feet.]

Group of counties.	Total timber.	White and Norway pine.	Hemlock.	Other conifers.	Hardwoods.
Wisconsin	29.2	3.2	11.6	2.3	12.1
Group 1	6.5	.5	2.1	.7	3.2
Group 2	2.8	.1	1.1	.1	1.5
Group 3	7.2	.9	3.1	.7	2.5
Group 4	5.7	.3	2.7	.2	2.5
Group 5	6.0	1.3	2.4	.5	1.8
Group 6	1.0	.1	.2	.1	.6

The counties in each group are as follows:
Group 1. Florence, Forest, Marinette, and Oconto.
Group 2. Langlade and Shawano.
Group 3. Vilas, Oneida, Lincoln, and Marathon.
Group 4. Price, Sawyer, Rusk, and Taylor.
Group 5. Iron, Ashland, Bayfield, and Douglas.
Group 6. The rest of the State.

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